

Alternative Transportation Study



For
Puerto Rico Highway 191
Recreation Corridor

El Yunque Ranger District
USDA, Caribbean National Forest

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Abstract

This study identifies key issues facing the Caribbean National Forest due to overcrowding and congestion along Puerto Rico Highway 191, which is the main route used by local and international visitors to reach the Forest. It provides access to 100% of all the developed recreation sites and key features. This study justifies the consideration and presents concepts for the implementation of an alternative transportation system into this highly sensitive Rain Forest. The Hispanic culture combined with local Puerto Rican customs provide for a unique set of circumstances that must be considered when contemplating managerial access controls into the Forest. The soon to be completed construction of El Portal Tropical Forest Center, a large interpretive and environmental education visitor's facility, will add to the already excessive number of cars and people on peak use days. Discussion includes using the need for transportation and other visitor services, as a catalyst for economic development for local rural communities.

Keywords: Transportation, Alternative Transportation, Customer Service, Vehicular Overcrowding, Access Control

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Executive Summary



Executive Summary

The Caribbean National Forest is facing some challenging issues. El Yunque Forest, as it is known locally, is one of the most beautiful and highly visited areas in Puerto Rico. Puerto Rico Highway 191 (PR-191) is host to all the developed recreation use that occurs on the Forest. During peak use days, the Forest becomes a retreat for residents of the San Juan metropolitan area. Local and international visitors combine to create a scene where cars, tour buses, and large groups of people dominate the character of the area.

Vehicular overcrowding and visitor overuse are primary concerns that alternatives presented in this study seek to address. Proposed are a combination of managerial controls and alternative transportation methods for access into the main recreation corridor. To stimulate the local economy, surrounding rural communities are considered as potential participants in providing needed visitor services.

Five alternatives including a NO ACTION alternative were evaluated for environmental, social, managerial and community socioeconomic impacts.

The “*No Action*” alternative will do nothing to improve the existing situation. The Forest will continue to receive an excess of vehicles and visitors on peak use day. Environmental impacts will be most noticeable near the roads where disorderly parking is common. Visitors will be subjected to safety hazards and will not receive the level of service they expect. Local communities will not improve their standard of living.

Alternative-A is the “*Managed Access*” alternative. It proposes that during known days of heavy visitation such as Fourth of July, vehicles going into the recreation corridor be counted until a predetermined number is reached. At that point, vehicles would only be let in as others leave. Picnic areas would only be available by reservation. Tour bus operators would be required to schedule their tours in coordination with the Forest Service.

Alternative-B, or the “*Voluntary Shuttle Bus*” alternative, would run during seasons and days of heavy visitation. Its use would not be free but would be voluntary. It would run from Palmer to El Portal Tropical Forest Center (EPTFC), and all points in the recreation corridor.

Alternative-C is the “*Mandatory Trolley*” and “*Preferred*” alternative. It recommends the use of a trolley system similar to the one at the Cuevas de Camuy visitor complex. A mini-bus shuttle would take visitors from a transportation center within the community of Palmer to EPTFC. After their visit to the Center, visitors would board a trolley and be taken to all the features and facilities located within the recreation corridor. Interpreters would be used during transportation to enhance the visitors experience.

The transportation system would run during the summer, on weekends, and on busy holidays. There would be a charge for using the service. It would be administered by a concessionaire or by the community of Palmer.

With alternative B and C, impacts on the Forest's environment would be reduced significantly. Visitors would be exposed to less safety hazards and would receive better service. Local communities would benefit from visitors using their services. Having an alternate transportation system would also open the doors of the Forest to those who do not have access to a vehicle.

Alternative D is the *Open PR-191* alternative. It contemplates the possible eventual opening of PR-191. Alternative transportation would be via shuttle mini-buses traveling between Palmer and Naguabo. Use of trolleys would not be feasible because the road would have high volumes of traffic. Use of Forest facilities by motorists would be common which would cause added maintenance and repair costs. Without control, this scenario could be detrimental to the health and well being of the Forest and its visitors.

It is recommended that this study be used to canvas for additional alternatives that address the key issues and opportunities presented. Forest managers, local community officials, and the general public should be allowed to present their opinions about possible changes affecting access to El Yunque.

A Transportation/Economic Feasibility Study should be prepared that examines, among other factors, the potential for working with local portal communities to achieve goals of interest and benefit to all.

As an example to most of Latin America and the Caribbean Basin, the Caribbean National Forest must lead the way in demonstrating how to provide for recreation in a rain forest while guarding its fragile environment. It is suggested here that this can be done while at the same time working to help local rural communities stimulate their economy and develop a sustainable source of economic development.

Introduction



Introduction

The Caribbean National Forest (CNF) or El Yunque, as it is known locally, is one of the most beautiful and highly visited areas in Puerto Rico. The Forest boasts being the only tropical rain forest in the United States National Forest system. Its size is relatively small (27,890 acres) compared to other National Forests, however its rich visual and ecological diversity make it a very highly valued National Forest as well as a national treasure to the people of Puerto Rico.

During summer months and holiday weekends, Puerto Rico Highway 191 (PR-191) on El Yunque becomes a haven for residents of the San Juan Metropolitan area. This use combined with international tourists creates a situation where cars, tour buses, and large groups of people become the dominating visual and social features on the mountain.

There is a growing concern over the vehicular congestion that occurs along PR-191. It is the most highly visited and impacted area of the Forest. This is a recreation corridor where all of the Forest's developed recreation facilities exist and where all of the most renowned and sought after historical and scenic features are located.

Alternative modes of transporting people to this extraordinary ecological reserve are needed. This must be accomplished to both satisfy the public's desire to know and experience the wonder of this Rain Forest, and to guarantee that the characteristics that make this place so special are cared for and protected.

Underdeveloped countries that also manage tropical rain forests, look towards the U.S. Forest Service in Puerto Rico for leadership and guidance in applying conservation technology and ecosystem management. One topic of sensitive resource management that is of particular significance to developing nations, is providing sustainable recreation opportunities and sustainable economic development. They need to do this while protecting sensitive ecosystems at the same time.

Keeping in mind that the CNF serves as an example for much of the Caribbean Basin and Latin America, this transportation study seeks to present alternatives on how to deal with issues and concerns created by excessive and uncontrolled visitation to a very ecologically sensitive tropical rain forest. This is a critical problem that puts pressure on the Forest's natural resources and reduces the quality of experience shared by visitors.

Project History & Goals



Project History and Goals

The need for this transportation study project has been apparent for several years. Annual visitation to the PR 191 recreation corridor has steadily increased. The ongoing construction and impending opening of El Portal Tropical Forest Center, an interpretive and environmental education facility, has magnified the urgency of exploring alternatives to reduce the volume of vehicles traveling to the Forest. El Portal will be located at the Forest entrance, along PR 191.

This project seeks to accomplish four main goals. They are as follows:

1. To identify and clarify the issues, concerns and opportunities created by and causing the problem of vehicular and visitor overcrowding in the Rain Forest.
2. To propose alternatives that address the problems and take advantage of the opportunities.
3. To present a process for implementing an alternative by motivating serious discussion between those interested in making changes that will benefit the Forest, its neighbors and its visitors.
4. To incorporate rural economic development as a vital catalyst and partner in resolving key issues.

Providing opportunities for neighboring rural communities to benefit from economic stimulation and sustainable development are important motives for the preparation of this paper.

It is anticipated that the findings and recommendations from this study will influence actions that will relieve the Rain Forest from vehicular congestion and will promote the use of group transportation.

Project Methodology



Project Scope and Methodology

In gathering information about how other agencies have modified management policy to control access into ecologically sensitive areas, it was learned that a detailed Transportation Analysis and Plan was the most common document prepared. This type of document employs the participation of transportation planners, landscape architects, recreation planners, engineers, sociologists, economists and visitor service specialists, among others.

Because of the limited data and professional assistance available within the time frame available to prepare this report, it was decided to use this opportunity to clearly define and elaborate on the challenges and opportunities facing the Caribbean National Forest. Especially those caused by existing and rapidly growing demands on the Forest's limited facilities and resources. With this situation convincingly identified, a process for implementing actions can be initiated.

To develop a comprehensive understanding of the many factors that have caused and may influence the existing situation, the following actions were taken:

1. Visitor and traffic patterns were observed and recorded.
2. Video film documentation of extremely heavy use days on the Forest were studied.
3. Count samples were collected in the Spring of typical weekday and weekend vehicular and visitor access into the Forest.
4. Inventory was taken of existing recreation and parking facilities.
5. Consideration was given to proposed new facilities within and outside the Forest that will contribute to the already existing seasonal congestion.
6. Relevant data from recent customer survey documents such as "CUSTOMER", were reviewed and incorporated.
7. Concerns and opinions were collected of those in the field responsible for managing the daily problems caused by overcrowding in the Forest.
8. Graduate planning students from the University of Puerto Rico were asked to assist in conducting 180 visitor interviews aimed at gathering information to help measure the feasibility of proposing changes to how visitors access the Forest.
9. The situation and needs of local and international tourists were considered to understand how they could best be provided with a safe and enjoyable experience in the Rain Forest while still practicing effective resource conservation.

10. Interviews were conducted with portal community officials and planning professionals to gather their ideas, opinions, and insights about how they and the Forest Service can work towards providing better service to tourists visiting the Forest, while stimulating the local economy.
11. Natural ecological preserves and other ecologically valuable areas in Puerto Rico were visited and their administrators interviewed. These are areas being managed in a manner that restrict public access and utilize reservation systems for visitation.
12. An extensive literature search was conducted to gather examples of how other natural resource managing agencies have dealt with problems of excess vehicular and visitor traffic in environmentally sensitive areas.

Alternatives were developed to address concerns and to take advantage of valuable opportunities. Although a preferred alternative was identified, it is understood and appropriate that other specialists and entities be consulted and other processes undertaken to identify and explore additional alternatives.

An alternative implementation process has been outlined that uses this report to justify follow-up to the recommendations presented. Key entities that need to be a part of this effort have been identified.

Overview of Issues and Opportunities



Overview of Issues and Opportunities

This section presents discussion of the key issues created by the existing situation on the Caribbean National Forest, and the opportunities afforded by considering an alternative transportation system and related actions.

Key Issues

- The PR-191 recreation corridor contains all of the developed recreation opportunities as well as the most sought after natural features and attractions that exist on the Forest.
- Parking capacity is inadequate to handle user demands.
- The overcrowding of vehicles results in an excess of visitors that eventually exceed the area's site carrying capacity.
- During peak use days, the recreation corridor experiences severe vehicular congestion.
- Vehicular and visitor overcrowding reduces the quality of the visitor's Forest experience and threatens the stability of the area's ecological balance.
- Uncontrolled use of the area leads to excessive litter build up. Facilities such as toilets are not able to handle the use load placed on them.
- EL PORTAL TROPICAL FOREST CENTER, now under construction, will add significantly to Forest visitation, and so will tourists from resorts recently constructed in the area.

Opportunities

- To reduce the reliance on personal vehicles to visit El Yunque
- To improve the visitor's experience by presenting a Forest that is less crowded, and more in character with its natural form.
- To manage the number of visitors within the recreation corridor, resulting in better service to each individual.
- To increase the Forest visitor's awareness about the Rain Forest's uniqueness and sensitivity through interpretation.

- To maintain recreation facilities in top working and aesthetically pleasing conditions.
- To be ready to serve an increased number of visitors.

Discussion of Existing Factors Related to Above Issues and Opportunities

Recreation On The Caribbean National Forest - The Caribbean National Forest is one of the most popular recreation areas in Puerto Rico. It is also an international recreation destination drawing thousands of visitors that want to experience a tropical rain forest. They come from the United States mainland and other countries. Combined with local users, the Forest receives approximately 650,000 recreation visits a year, making it one of the most heavily visited forests per acre in the entire National Forest System.

The Forest provides high quality recreation opportunities not easily available elsewhere on the Island. Recreation occurs in a setting of scenic landscapes, clean and abundant water, fresh air and cooler temperatures than nearby urban areas.

Recreation occurs year round in Puerto Rico's tropical climate, but the mix and volume varies seasonally. Use by local visitors is greater during the summer, while international visitor numbers increase during the winter.

Forest recreation activities include picnicking, hiking, water play, driving, scenic viewing, and nature study. Summer home occupancy and primitive camping are relatively minor uses. The Forest's tropical setting, high visitation and proximity to a major population center combine to form a unique opportunity for interpretation and environmental education.

The steep, rugged topography, dense vegetation, and frequent rains limit most recreation use to areas near the roads. All developed facilities and most recreation use occurs in an area of about 1,500 acres on the North side of the Forest along PR-191. This pattern of use results in crowding, parking and traffic problems, particularly on hot summer weekends.¹

Pattern of Recreation Use and Different Visitor Types - Visitation on the Caribbean National Forest is influenced significantly by season. The year-round warm weather of the Caribbean region brings large number of cruise ship passengers and other tourists to the area. International visitors represent the majority of Forest users during the Winter, and to a lesser degree, during Spring and Fall. The summer season and holidays bring the highest use by local residents to the Forest. With children out of school, and summer temperatures being magnified in urban areas, El Yunque becomes a popular destination. The majority of local use occurs during weekends, especially on Sundays. Summer holiday weekends such as 4th of July and Labor Day are days that see the Forest inundated with excessive traffic and use.

¹ Paraphrased from Caribbean National Forest Draft LRMP, July 1993.

There are three distinct group types of visitors that frequent the Forest. Each group varies in volume according to season and days of the week as described above. The first group are the international tourists. The majority of these visitors are usually a part of large tour excursions sold by local outfitter guides. Some tourists however, do visit the forest in rented cars, and a few even visit the Forest by taxi cab.

The most popular Forest destinations for tourists have excellent opportunities for picture taking. These include La Coca Falls, Yokahu Observation Tower, CCC era historic structures and various vista points along PR-191. Many international visitors seem to share the common objective of experiencing a tropical rain forest. World wide deforestation is a topic which is well known and a concern by most westerners. This is probably a big reason why El Yunque is major tourist attraction.

The second major type of forest visitors are Island residents who share similar interests as the off Island group. They too seek contact with the natural environment. Beautiful views, pristine surroundings and educational opportunities are important. Within this group are students of all age groups, including those who are brought in school buses. Teachers bring students to inspire their concern for nature and appreciation for the Islands rich resources as well as to teach them about ecological processes.

The third type of visitor groups are Island residents seeking developed recreation facilities and social interaction. This group makes up the majority of the summer, weekend and holiday crowd. The Forest's cooler temperatures, picnic facilities and abundance of streams and rivers are major reasons why they come. The manner in which they come equipped, and the activities they engage in resemble that which would be found in a rural park setting. It is common to see the Forest become host to a party atmosphere with music, games, and family groups of over 15 per picnic unit. It is apparent that the main objective for these visitors is to socialize, and that seclusion and a quite restful forest setting is not a priority nor expected.

Significant social interaction is much more the custom in Puerto Rico than what is experienced in the United States, especially in a forest environment. International visitors may be less tolerant of crowds and high level of social interaction in a forest environment. The extended family concept prevalent in the Hispanic culture, makes it easier to adapt to the highly social environments encountered on the Caribbean National Forest. What may seem like an excessive number of people in one area to a forest manager, may seem very normal here. However, the true indicators that tell us how much is too much, should come from the land and its resources.

Understanding and respecting the different user groups is critical when considering how to manage use on the Forest. Controlling access without restricting the visitor's privilege to enjoy themselves represents a challenge and would be very controversial.



Facilities, Parking and User Demand - Recreation facilities and featured attractions along PR-191 include picnic areas, vista points, trails, historic construction from the Civilian Conservation Corp (CCC) era, water features and interpretive wayside exhibits. All together these facilities can comfortably accommodate approximately 1,116 People At One Time (PAOT). Officially designated parking spaces located at or near facilities and attractions accommodate only 221 cars. When you add the "unofficial" 148 overflow parking spaces created and used by visitors on road shoulders, the total increases to 369. This represents enough parking to fully saturate existing facility capacities when assuming 3.5 people per vehicle, which is the standard used by the Forest Service in the States for project planning estimating. It has been observed that this number is probably higher in Puerto Rico.

Although the use of overflow parking allows facilities to be used to capacity, the negative impacts caused by vehicles parked in undesignated areas outweigh the benefits. Vegetation is destroyed, soils are compacted, erosion perpetuating gullies are formed, and hazards to customers increase. The Forest's natural visual quality is also greatly depreciated as vegetation is damaged and vehicles tend to dominate the otherwise natural appearing landscape.

Unfortunately, demand on this recreation corridor does not end when visitors in their vehicles have exhausted all easily attained parking. On heavy use days, demand for PR-191 facilities far exceed their carrying capacity. This results when the number of visitors increase as they also park in unsafe and inappropriate locations.

Uncontrolled access into this area has created a major burden to the Forest environment and those managing it. The public also suffers the consequences by not receiving the service and quality experience that is expected. The excess of vehicles is accompanied by an excess of people trying to fit into an area that has limited and very sensitive resources. Another consequence of vehicles parked along the sides of the road is that visitors must use the road as a pedestrian access route to their ultimate destination.

In addition to limited parking for vehicles, there are only two designated parking spaces for buses, and both of them are located at the same location. As a result, when buses arrive at locations where no spaces are designated, they park in the car lots or on the side of the road. In car parking lots, buses significantly reduce the spaces available by taking up too much space and by obstructing passage. When on the side of the road, they reduce visibility and road bed width, creating serious safety hazards.

Can the Caribbean National Forest realistically satisfy demand with the limited facilities, personnel and natural resources available? It cannot be done all the time. We, as the Forest's caretakers, must decide when enough is enough for the good of the resource. We can allow for the enjoyment of the Forest, but we need to distribute use in quantities and over areas that will allow sustainability.

New Facilities On and Off the Forest - With the construction of El Portal Tropical Forest Center, traffic on PR-191 will increase significantly. Although El Portal will not be within the most impacted section of PR-191, where all of the developed recreation sites and popular features are located, it will be accessed primarily from, and will be located along PR-191.

El Portal has been designed to serve 600 PAOT. Its parking lot will be able to hold 132 cars, 15 mini buses and 4 full size buses. The lot has been sized appropriately to handle the volume of visitors that can comfortably fit on the site and within the facilities. According to a suitability study prepared for the El Portal project, it is estimated that the new facility will bring approximately 300,000 additional visits to the Forest a year.

At El Portal, visitors will be encouraged to learn more about rain forests by visiting El Yunque. It is expected that most visitors will travel up PR-191 to reach the Forest. Efforts will be made however, to draw the visitors attention to other parts of the Forest.

To complement El Portal, and as part of the Forest's overall interpretive program, new wayside exhibits are planned at locations along PR-191. These additional features are not expected to contribute significantly to the number of people using the PR-191 recreation corridor, but they may cause visitors to stay longer.

New resort and hotel complexes are being planned and constructed on the North East coast of Puerto Rico. This part of the Island has been designated by the Puerto Rico Tourism Company as a targeted area for new tourism ventures. The area's attractive beaches and relative closeness to San Juan are part of the reason. El Yunque is another important reason. It is not unusual for resort and hotel companies to use their proximity to this Rain Forest as a lure to attract guests.

The new world class El Conquistador Resort opened for business in late 1993. It is within 10 miles of the Forest and boasts 750 rooms. This resort is making plans to bring guests to the Forest in their own fleet of tour buses.

The Rio Mar residential complex located within 4 miles of El Yunque, plans to build a 600 room hotel. This kind of development can be expected to continue since the Puerto Rico Tourism Company is extremely active in promoting Puerto Rico as a prime Caribbean destination. The existence of a rain forest in Puerto Rico is used in their promotional literature and advertisements.

These newly constructed and future tourist attracting facilities will present additional pressures on the already heavily used PR-191 recreation corridor. Uncontrolled access will result in significant negative consequences to the environment and to the experience encountered at El Yunque.

Limited Law Enforcement - The Caribbean National Forest has 3 full time Level 2, law enforcement officers. Rarely are they all on duty at the same time. Controlling irregular

parking is something they could easily spend all their time doing during heavy use days. While attempts are made to keep roads clear and hazard free, it eventually becomes an unending struggle.

The Forest has a group of senior employees that are used to occupy visitor information stations along PR-191. When visitation on the Forest is high, they do their best to efficiently fill the parking lots. Once the lots are full, they stand on the road and try to direct traffic. This is a thankless and very difficult job which is hazardous to their safety. On days of extreme vehicular congestion, the Forest opts to bring in additional personnel to manage the traffic and eventually restrict entry. This option is used as a last resort.

Regardless of what solutions are sought to ease the problem of vehicular congestion on El Yunque, it is clear that enforcement of managerial controls will be a necessary part of the strategy.

Key Issues

- PR-191 is the only access into the Forest's main recreation corridor. There is only one way in and out.
- The physical character of PR-191 cannot safely or adequately support the type of traffic it receives on peak recreation use days.
- Vehicular overcrowding leads to serious safety hazards such as:
 1. Protruding cars parked on roadway shoulders.
 2. Visitors walking on the road.
 3. Reduced visibility for drivers.
 4. Unsafe maneuvering by drivers.

Opportunities

- To improve visitor health and safety.
- To maintain number of vehicles on PR-191 to manageable levels.
- To work with road administration agencies towards improving conditions of PR-191.
- To better meet visitor's needs and expectations.

Discussion of Existing Factors Related to Above Issues and Opportunities

Puerto Rico Highway 191 (PR-191) - This highway is a two lane asphalt road. It transects the Caribbean National Forest in the middle running North South. At one time this road served as a connector between the North and South side of the Island, but in 1981 a massive landslide rendered a section of the road destroyed. Since that time, a controversy has lingered as to whether the road should be repaired and reopened.

Prior to the slide, PR-191 started at PR Highway 3, the main coastal route on the North, and ran approximately 30.2 Km. South through the Forest to Puerto Rico Highway 31 on the other side of the Forest. This route was used by the public as a link between the Eastern, North and South of the Island. At present Southbound PR-191 dead ends at Km. 13.25. It is up to this point that the public has access. A closure gate excludes vehicular use by the public, but does allow travel on foot. The closure gate also marks the end of developed recreation facilities. (See map on page 61)

As a result, all traffic entering the Forest from the North must eventually turn around and exit the same way. At times of heavy visitation this causes a bottle neck affect. This problem is substantially magnified when there are buses present.

PR-191 is not well suited for use by buses and other large vehicles. The usable paved road bed ranges between 18 to 24 feet depending on the immediate surrounding topography and past land slides. The road's pronounced uphill grade and numerous curves, some of them "hairpin" type, combine to make PR-191 unfavorable for other than personal vehicles.

On the North side, PR-191 starts at about sea level and rises only approximately 30 meters in the first 3 Km. From that point the road winds up the mountain to a maximum elevation of 750 meters (2,460 ft.) in a distance of 10 Km. This represents a steady climb at a 7.5 % grade.

Large tour buses carrying international visitors and school buses are very common users of PR-191. These buses have difficulty maneuvering up to El Yunque. When two buses going in opposite directions encounter each other on a sharp curve, one must back up to allow the other to pass. A combination of these buses and heavy regular traffic result in long lines of tailgating vehicles going up and down the road. There are no safe opportunities to pass between Km. 3.0 and where the road dead ends. Serious safety hazards exist from the uncontrolled use of this section of PR-191. The use of this road by large buses is less than appropriate. This situation also contributes to environmental degradation in the form of diesel fumes and noise pollution. Other consequences include destruction of vegetation on road shoulders, soil compaction and subsequent creation of gullies leading to increased soil erosion.

The social consequences related to the scale and function of PR-191 involve the reduced quality of experience for Forest visitors. The road's scale in itself is appropriate for carry-



ing limited numbers of vehicles and people up and down the mountain. The concern arises when the road physically cannot support the volume of traffic generated by visitors during high demand periods. The congestion and presence of so many vehicles in the Forest's primarily natural setting is extremely incongruent. PR-191 has a physical and social traffic capacity that is easily exceeded.

Due to the steep mountainous character of this area, PR-191 cannot be made wider without major expense and environmental consequences. Although almost all of the traffic on the road is for recreation purposes, it also serves a limited number of private land and business owners, communication company employees, and Navy personnel who operate a microwave communication outpost on East Peak.

The Potential Reopening of PR-191

Although it is not the purpose of this report to discuss the appropriateness of making PR-191 usable for North-South travel, it is important to cite the circumstances related to this issue that affect this study.

Providing controlled access into the Forest and alternative transportation up and down the PR-191 recreation corridor would be compromised if PR-191 is reopened to free flowing North-South traffic. Provisions would have to be made so that through traffic is not impeded or obstructed by slower vehicles traveling up PR-191.

It would be much harder to enforce management controls on the numbers of people and vehicles in the Forest since we would not be able to restrict traffic to only those who had reservations or were riding alternative transportation vehicles. It would also be much harder to encourage visitors to leave their vehicles in a central parking area when others would be driving up the road.

The positive aspects of opening PR-191 is that alternative transportation could also be provided from the South side. The community of Naguabo could be host and beneficiary of this service. Eliminating a dead end road situation would also reduce the in-and-out traffic to some extent on the North end.

Key Issues

- Although valuable, El Yunque's natural resources have not contributed substantially to the economy of the area.
- Neighboring rural communities are in need of sustainable economic development.
- The North side approach to the Forest on PR-191 and through the community of Palmer, is in need of definition and revitalization.

Opportunities

- To stimulate sustainable economic development for local rural communities by having them become the transportation and commercial hubs serving visitors to El Yunque.
- To present the provision of recreation services as a model of environmentally sensitive sustainable economic development to other Latin American and Caribbean Basin Countries

Discussion of Existing Factors Related to Above Issues and Opportunities

Main Approach to Forest Through Community of Palmer - PR-191 is by far the most heavily used access route to the Forest. At its Northernmost point, it initiates at PR Highway 3 (PR 3). It is also here where the rural community of Palmer is located. At present the junction of PR 3, PR-191 and Palmer is a very incongruent combination of roads, narrow streets, buildings, signs, and jumbled traffic patterns.

The first street off of PR 3, which is officially the beginning of PR-191, is an extremely narrow one-way street that funnels traffic for the length of a city block to an unaligned and confusing intersection. At any time when more than two cars converge there, passage is slow, difficult and hazardous. In addition, it is very difficult to tell if you are headed in the right direction.

There is concern that this aesthetically uninviting passage is not appropriate as a prelude to the Rain Forest. Improvements to this important access point are imperative if we desire to improve safety, comfort and convenience to Forest bound users of this route. This would also help the community of Palmer to be recognized as more than just an annoying section of semi-rural sprawl with poorly planned streets and structures.

Construction of El Portal Tropical Forest Center represents an example of Forest Service commitment to environmental education, and a demonstration of sensitive ecosystem management. Visitors on their way to the Forest and El Portal should begin their rain forest experience in a manner consistent with what they will be learning about. Their transition from the highway to the road that will take them to the Forest would be much more appropriate if it is compatible and in character with their destination.

It is in the best interest of the Caribbean National Forest and the community of Palmer to work together towards creating an appealing and worthy "Gateway" to El Yunque.

Local Rural Communities - "Portals to the Forest" - The Caribbean National Forest has several rural communities as neighbors. Two in particular, Palmer and Naguabo serve as portals to the Forest on either side of PR-191, Naguabo on the South and Palmer on the North.

Both communities are interested in using their proximity to the Forest as a basis for stimulating local economic development. Each community has distinctively different characteristics that can help position them as providers of products and services aimed at Forest visitors.

Palmer is the Forest portal to approximately 90% of international visitors and 75% of local visitors. Its proximity to San Juan and the large resort complexes nearby are the main reasons why so many people come through Palmer. The north side of PR-191 is where all of the developed recreation facilities and popular Forest features are located. With innovative planning, Palmer can present itself as the formal "Gateway" to El Yunque.

In May of 1993, the Municipality of Rio Grande, of which Palmer is a part, applied for and received Federal funds through the USDA Economic Recovery Program. These funds are being used to prepare the "Palmer Economic Development Plan." This planning instrument will identify what needs to happen to revitalize neighborhoods, stimulate economic development, improve infrastructure and attract tourism. All recommended actions will be aimed at making Palmer an attractive and inviting community that will motivate Forest bound visitors to stop and consume products and services.

The citizens and governing officials of Palmer believe that with the construction of El Portal Tropical Forest Center, and the many more people attracted to the area, they can benefit from receiving a share of the economic windfall.

The south side of the Forest is accessed through the Municipality of Naguabo. This community also seeks to stimulate its economy and improve its standard of living by using the Rain Forest to attract tourism. This side of the Forest however, is isolated from the North by the closed section of PR-191. Forest visitors cannot travel further South on the Highway than where the road closure is located at Kilometer 13.4. Those who wish to reach the other side, must do so by driving around the East side of the Island which can take one or two additional hours, depending on traffic.

Another factor that negatively affects the potential economic opportunities for Naguabo is that the Forest is devoid of any developed recreation facilities on the South side.

Naguabo is one of the few entities vocally in favor of repairing and reopening PR-191. They feel that their community can be an additional destination option for Forest visitors if it wasn't for the present dead end situation at the road closure. Their uncrowded beaches and much less "touristy" character are features that can significantly attract a segment of the tourist population.

To draw more tourism to the area, Naguabo is presently promoting the concept of being the gateway to a more pristine, much less congested side of the Rain Forest. This strategy has valuable potential based on the growth of the ecotourism industry.

The Municipality of Naguabo is in the process of also requesting Federal funding through the USDA Economic Recovery Program to study alternative means of attracting tourism to the area.

Evaluation of Data



Evaluation of Data

Various sources of data, inventories, and surveys were used to analyze and evaluate physical and social characteristics concerning recreation use in El Yunque. Topics examined include:

Visitor use volume, patterns needs and desires
Transportation modes
Traffic volume and frequency
Existing recreation facilities along PR-191
Existing parking availability along PR-191

The documents and surveys were a combination of existing studies and data gathered specifically for this report. What follows is a discussion of the pertinent information from each source used to develop recommendations that address the issues and opportunities facing the Caribbean National Forest.

"Customer"

CUSTOMER is a survey study of visitors to El Yunque to assess their socio-demographic background, expenditure patterns and satisfaction levels using a lengthy questionnaire employed nationwide, but incorporating questions germane to El Yunque as a recreation site. The CUSTOMER project is part of a joint effort between the Caribbean National Forest, the Southeastern Research Station of the Forest Service, at Athens, Georgia, and the Center for Applied Social Research of the University of Puerto Rico at Mayaguez.¹

All of the data presented in this section is from visitor surveys taken by CUSTOMER that were given to residents of Puerto Rico. In CUSTOMER the findings were divided into four groups depending on where the visitors reside. The locality divisions used were 1) the San Juan metropolitan area, 2) other metropolitan areas, 3) rural areas near the Forest and 4) rural areas not near the Forest. For the purpose of simplicity, numbers shown here represent the total of all four groups, regardless of where the visitors live.

¹ Manual Valdes Pizzini, Alfonso Latoni, Virgilio Rodriguez, Fernando Silva, "El Portal Front End Evaluation of Visitors," 1992, p.2.

Figure-1 provides insight about who visitors come to the Forest with.

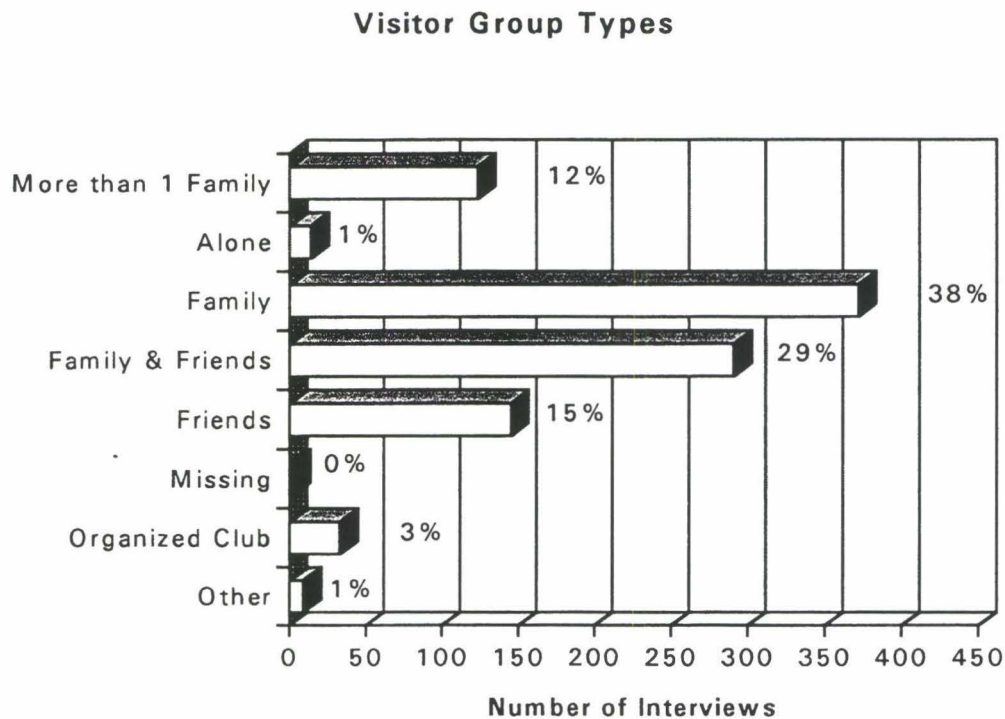


Figure - 1

Interpretation

This information tells us over 80% of visitors enjoy coming to the Forest in the company of others rather than by themselves. This is interesting in that not many come for the sole purpose of enjoying the tranquillity and seclusion of the rain forest. Perhaps they make their plans knowing that El Yunque, while beautiful and pristine, is not where to go to be alone.

Managerial Implications/Recommendations

We must plan facilities and services knowing that our customers usually come to the Forest in groups. Coming to El Yunque is a family affair. Children need to be accommodated and designed for. Health and safety are extremely important in all areas. Ease of accessibility must be considered for the physically challenged including senior citizens and families with small children.

Figure-2 gives us related information about the group size our customers tend to travel in.

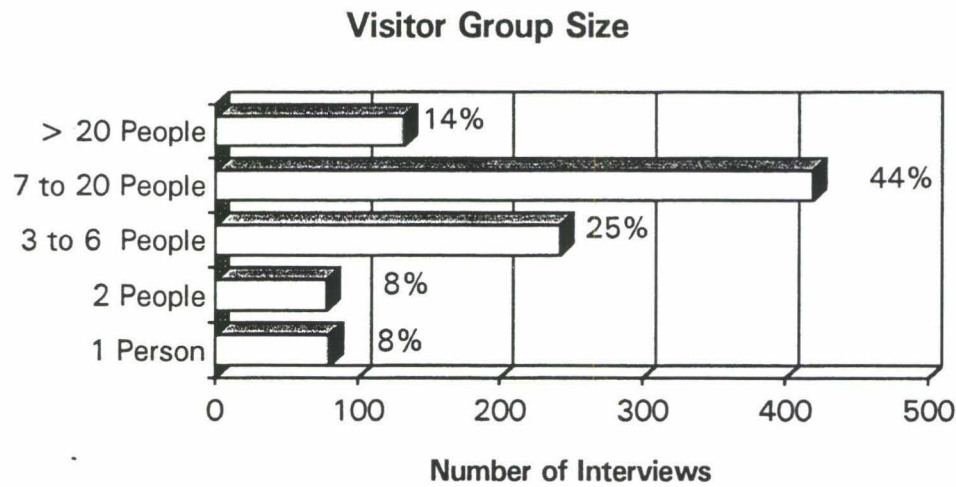


Figure - 2

Interpretation

Puerto Rican residents come to the Forest in large groups. Close to 50% of all those interviewed stated that when they visit El Yunque, they do so with groups of over 7 people. These groups come the Forest in more than one vehicle and participate in activities that can be shared by larger numbers.

Managerial Implications/Recommendations

We must accept that use in El Yunque is not the same as in a forest located in the United States. Facilities must be designed and constructed to accommodate and withstand heavy use. Standards used on other National Forests regarding appropriate spacing between picnic sites do not apply here. Comfort is achieved and maintained here within much higher levels of social interaction. A site's social capacity is much higher. It may be more difficult to maintain facility use within its physical and environmental capacity since local customs will have a bearing on customer attitude and willingness to comply to limits on levels of use.

Figure-3 gives us an insight into how long our customers tend to stay at El Yunque.

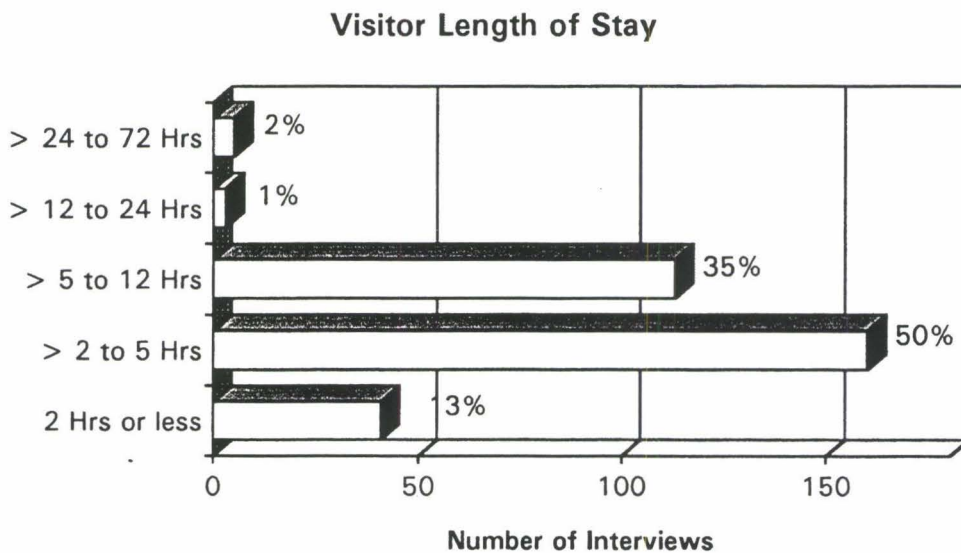


Figure -3

Interpretation

On average, up to 50% of those interviewed plan to spend 2 to 5 hours on the Forest. It can be assumed that these visitors will engage in activities that keep them relatively close to the road. Another 35% extend their visit to between 5 to 12 hours. These visitors are interested in participating in all day excursions or picnics. Very few visitors stay longer than 12 hours.

Managerial Implications/Recommendations

We should plan on providing for the types of activities that can be enjoyed in relatively short periods of time. Any kind of public transportation provided should run on a tight schedule. We need to make provisions to accommodate the large number of visitors who come equipped to stay all day. They would want to bring enough food and supplies to keep them comfortable. Options must be considered for transporting people and their supplies up to their destination, while providing safe and secure parking at a centralized area. This situation also suggests that we may want to consider providing for the sale of basic picnicking supplies close to the picnic areas.

Figure-4 provides an economic profile of Forest visitors

Annual Income of Visitors

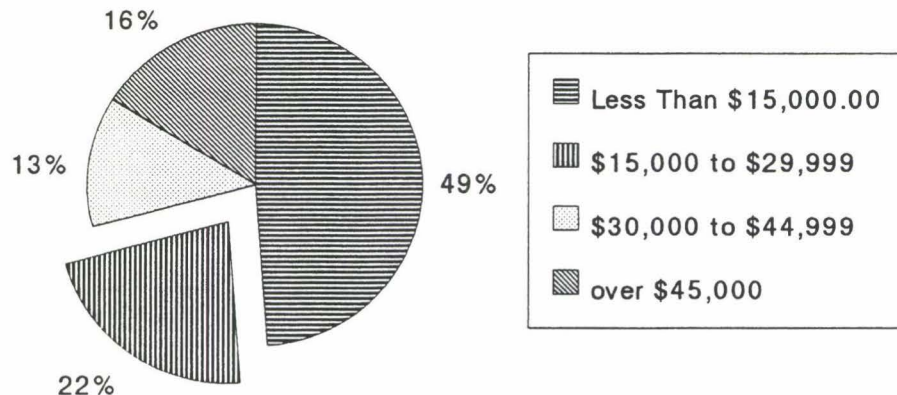


Figure - 4

Interpretation

By United States standards, almost half of our customers support themselves and their families on very low incomes, while over a forth are in the middle to high income bracket. Most local visitors would be concerned about any charges associated with visiting El Yunque.

Managerial Implications/Recommendations

Any consideration of charging for facilities or services at or to El Yunque would have to be carefully considered. Creative forms of making the use of an alternative transportation system attractive and a "good value" would be necessary. Affordability should be a primary criterion.

Figure-5 gives us a good picture of the different reasons people visit El Yunque.

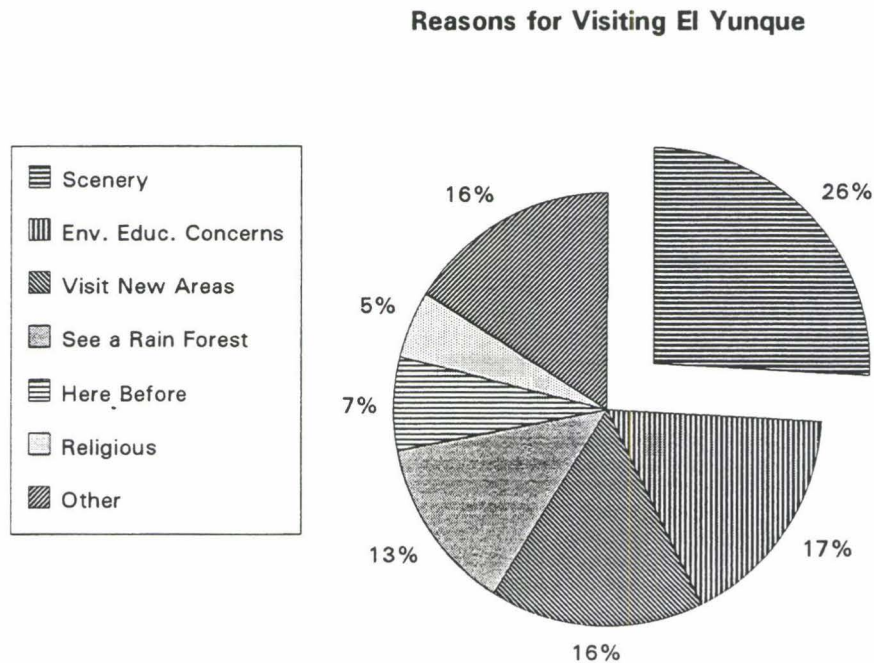


Figure - 5

Interpretation

Although most of those interviewed cited that they came to El Yunque to enjoy the views and scenery, a large percentage of them came for other reasons. Most respondents, except for those who simply came to "visit a new area", came for reasons that could only be satisfied in a rain forest, if not this rain forest. The "OTHER" reasons for coming to El Yunque included: to use facilities, because it is "less crowded", and to see a Parrot, among others.

Managerial Implications/Recommendations

Visitation on the Forest will continue to be high since we are the closest provider, and in some cases the only provider, of the resources which draw people here. We must manage the Forest in a manner that will protect its scenic quality. We must improve the facilities we have and protect the quality of the environment by considering ways to limit visitation to manageable levels.

Figure-6 shows what people spend their time doing when they come to the Forest.

Main Activity at EL Yunque

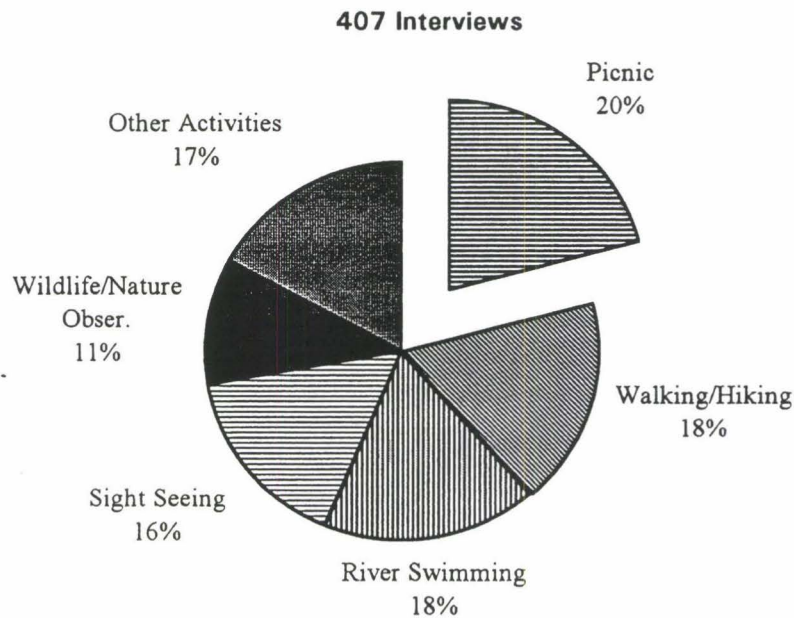


Figure - 6

Interpretation

While on the Forest, most people engage in passive recreational activities. Active recreation is mostly limited to hiking and river water play. Picnicking and water play characterize the local visitor.

Managerial Implications/Recommendations

Except for picnicking, all of the activities visitors enjoy while on the Forest, can be done without the need to come in a personal vehicle. Bringing visitors up the mountain in an alternative form of transportation should not be a problem for most. However, we do need to consider how to accommodate the needs of those wanting to picnic. This will be more complicated at El Yunque since group sizes tend to be large and picnicking is a major extended family event.

"Did you come to the Forest in a private vehicle today?" was a very related survey question asked.

Of the 540 responses recorded, 516 (95%) answered yes.

Interpretation

Almost all residents of Puerto Rico who visit El Yunque, do so in their own vehicles. Although our customers may enjoy the convenience of driving to the Forest, it is important to note that they do not have an alternative means since no public transportation is available to El Yunque. The only other way Forest visitors come to the Forest is by taxi cab, tour buses, school buses or rented vehicles, but these alternatives are either impractical or unaffordable to the majority of Puerto Rico residents.

Managerial Implications/Recommendations

Until there is an alternative to driving to the Forest, we will continue to deal with large numbers of vehicles on PR-191. Personal vehicle transportation to the Forest will continue to cause crowded parking lots, vehicular congestion and negative environmental effects. We must seriously consider alternative ways of bringing people to the Forest or face the need to implement managerial controls during periods of heavy visitor use.

Figure-7 shows the value Forest visitors place on having defined parking areas and security when at El Yunque.

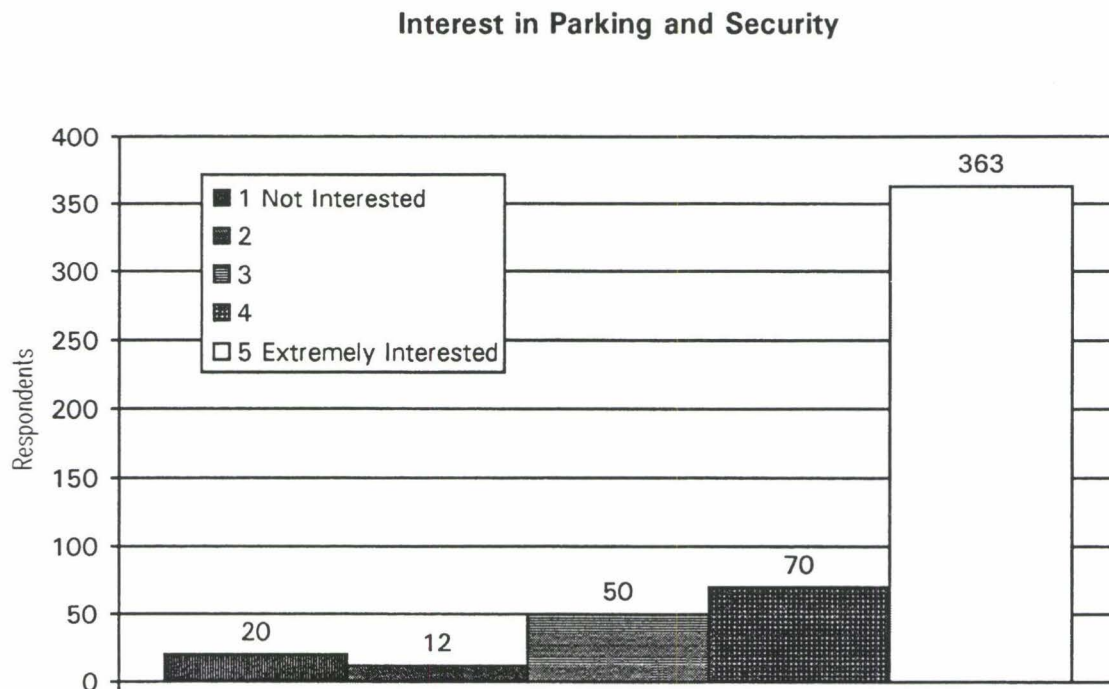


Figure - 7

Interpretation

Nearly 3 out of 4 people interviewed expect to have the convenience of adequate parking and peace of mind knowing that security will be provided while they are visiting El Yunque. A conclusion can also be made that visitors may not want to be on the Forest unless these needs are met.

Managerial Implications/Recommendations

We should be doing all we can to provide as much safe and secure parking to our customers within the bounds of assuring that there is no detriment to the environment. We should develop a method of notifying Forest bound visitors when parking is saturated, and when we can no longer maintain reasonable security or provide adequate service to them.

Figure-8 displays the result of the following question: *"When the parking areas are full, the Forest Service should..." (choose all that apply).*

Alternatives selected by Visitors

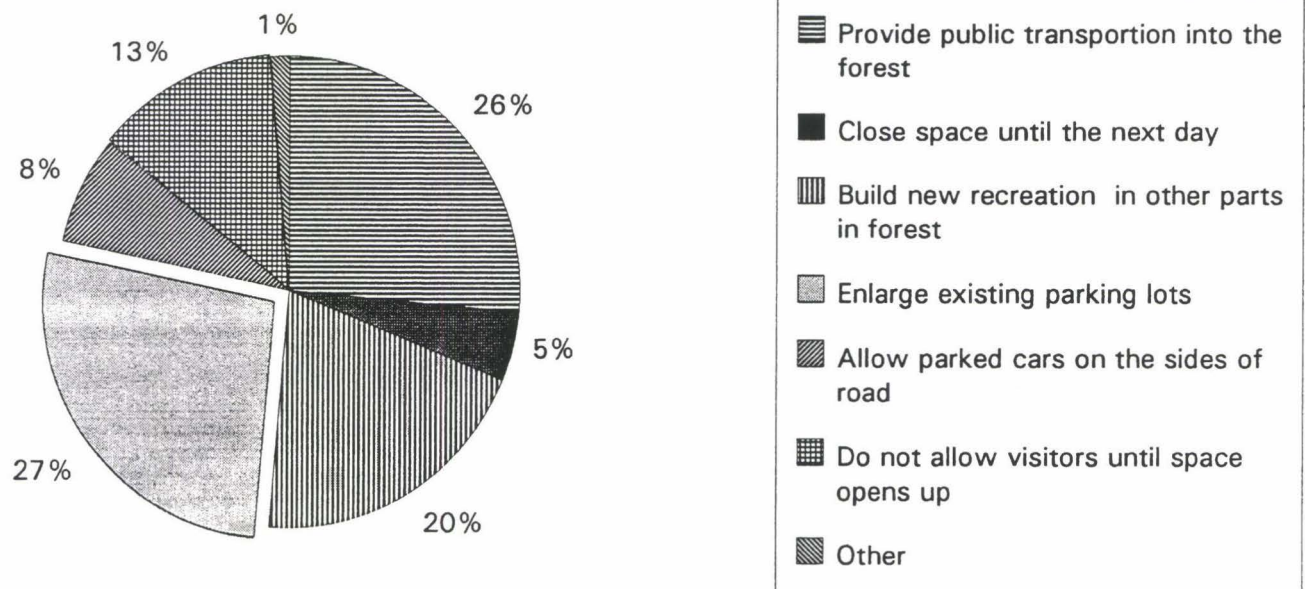


Figure - 8

The interviewees were allowed to make as many selections as they felt should be considered as alternatives. It is not known how many visitors answered this survey question but we do know that there were a total of 1,500 selections made. The pie chart is based on those 1500 choices.

Interpretation

The three most selected alternatives would make it necessary for the Forest Service to take major action to either provide public transportation to the Forest, enlarge existing parking lots or build new recreation areas in other parts of the Forest. The least favorable alternative for visitors was to close the Forest until the next day. They thought that before closing the Forest, we should just not allow more people into the Forest until space becomes available. Visitors seem to be willing to cooperate and use other means of transportation or even use other areas of the Forest. What they do not want is to be shut out of El Yunque.

Managerial Implications/Recommendations

We should consider this information as visitors giving the Forest Service direction and permission to give them other options so they are not restricted from enjoying the Forest. It is also an expression of the visitors' expectations. We can choose to implement managerial controls such as forcefully limiting site capacity or implementing a reservation system for picnic areas. However, any such action may not be received well unless we do an excellent job of notifying the public and "selling" the reasons why such actions are necessary and beneficial to the Forest. As stewards of such a widely treasured resource as El Yunque, it is our responsibility to consider the effects of all alternatives before implementing any changes. Alternative forms of transportation to the Forest must be considered.

Figure-9 gives a picture of how much Forest visitors are willing to pay for parking at guarded lots during their stay at El Yunque.

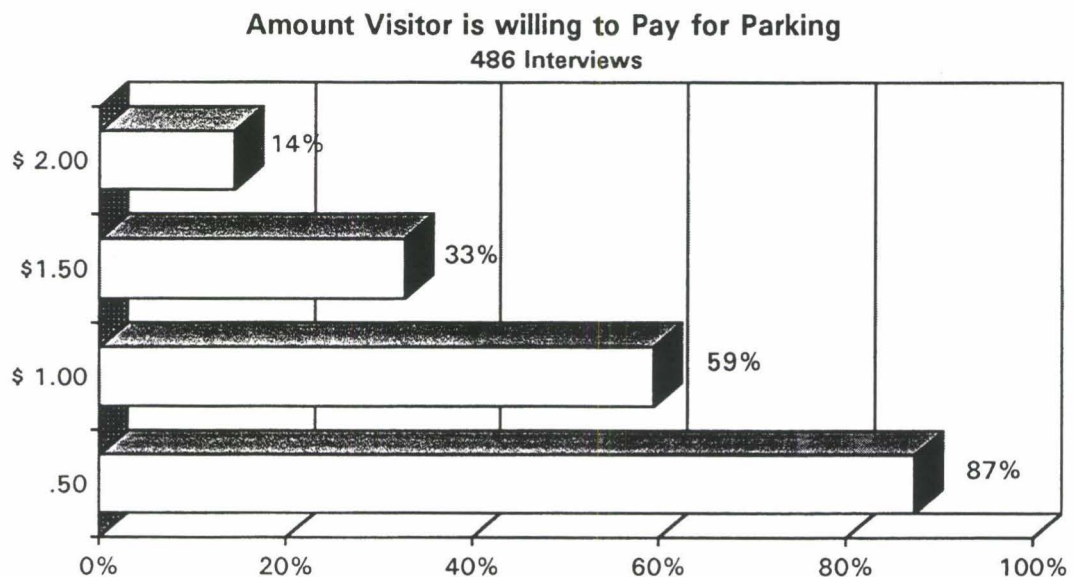


Figure - 9

Interpretation

Although most visitors are willing to pay something for parking, they are not willing to pay very much. Only 17% would pay \$2.00 to park in a secure lot. This sentiment may be for financial reasons, or it may be because they are resistant to pay for being allowed to be somewhere that is "theirs".

Managerial Implications/Recommendations

Physical space to build more parking in El Yunque is not available. Therefore, if we charge for parking, it would be for existing spaces. The economic concept of supply and demand might suggest that all we have to do is charge high enough for parking to control the amount of use an area gets. We do not have the legal option at this point to charge for parking, and much less to charge "as much as we want". But even if we could, what we would end up doing is excluding those less financially well off from the Forest. This data suggests however, that charging for parking is an option, not for the FS necessarily, but for an entity in perhaps the private sector that could combine parking with other services to make the choice more attractive to potential customers.

Figure-10 gives us some interesting insight about how much Forest visitor's are willing to pay for public transportation up to El Yunque. First the interviewees were asked: *"If guarded parking lots were provided, would you be willing to park at the entrance to the Forest and use public transportation within the Forest?"*

Out of 467 responses, 63% were positive. Out of the same group, 421 visitors were then asked how much they would be willing to pay.

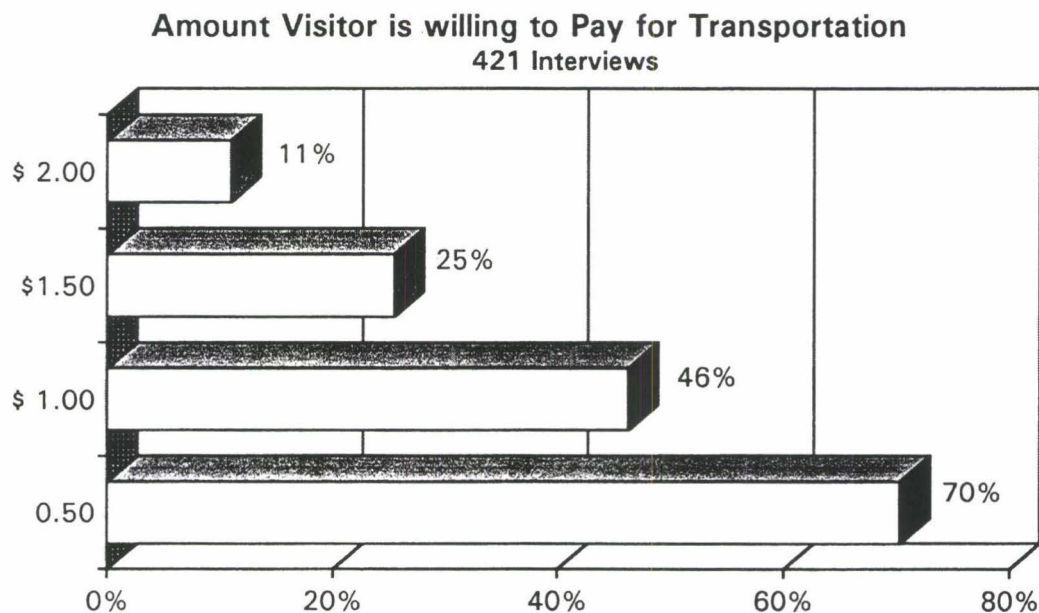


Figure - 10

Interpretation

There are really two questions here. The first has to do with visitors willingness to leave their cars behind and use public transportation to get to El Yunque. According to the findings, a clear majority would be willing to do so if the parking was secure. Those willing to use the public transportation, would not be willing to pay very much. Only 11% of those interviewed would be willing to pay as much as \$2.00 for a ride to El Yunque. However, in this survey people were given a range of fees to choose from, so it would be natural for them to select the lower fees. The true value they would place on such an option may be higher.

Managerial Implications/Recommendations

There is evidence that most of our customers are willing to come to the Forest in other than their own vehicles. We should promote the concept of visitors coming to the Forest in an alternative transit system such as trolleys or mini-buses. Since visitors are not willing to pay much, this service may need to be made more attractive by offering other complimentary and very appropriate activities such as on board interpretation. We can begin canvassing potential partners also interested in benefiting from such a venture. Portal communities desirous of sustainable economic development would be natural candidates.

Following the same concept introduced above, visitors were asked what type of additional services they would like to have available to them. The following question was asked: ***"If available, would you take part in eating at restaurants located in the Forest?"*** Out of 536 who responded, 82% said that they would.

Interpretation

It is obvious from responses that Forest visitors are interested in eating while they are at El Yunque. This indicates another "expectation" of Forest visitors in general.

Managerial Implications/Recommendations

If we do not provide our customers with the services they expect and need, they will be dissatisfied with their visit to the Forest. Since we consider ourselves a public service oriented agency, we need to work towards facilitating the provision of food services to our customers. In studies conducted about what attracts people and gives them a reason or excuse to come together, food was considered the number one catalyst.² If the concept of food services and the provision of transportation can be melded together into one location, Forest visitors will have an excellent incentive for considering using such a facility. We should support and promote the development of a transportation hub where food services are available.

Visitors were asked what kind of information and facilities they were most interested in when at the Forest. Figure-11 displays evidence that interpretation is another service our customers want more of.

² William H. Whyte, "The Social Life of Small Urban Spaces". 1980, p.50.

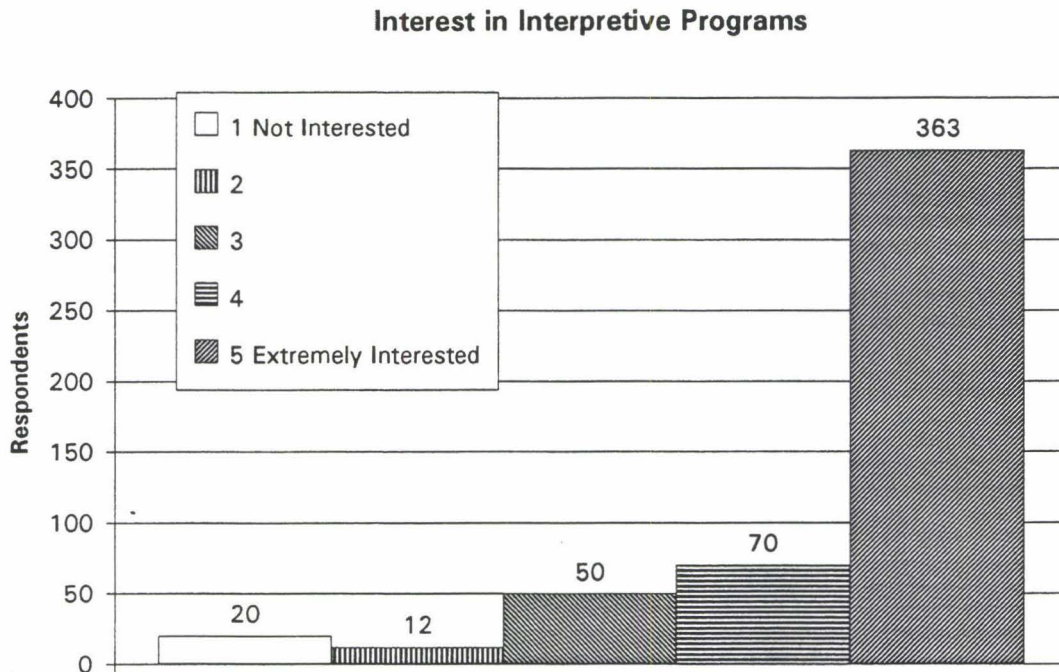


Figure - 11

Interpretation

Seventy-five percent of those who answered whether or not they are interested in interpretation, responded that they were either extremely interested or one step below. Our customers would like to receive more information about the Forest, its processes, and the things that live in it.

Managerial Implications/Recommendations

We must accelerate the implementation of projects that will provide more opportunities for interpretation to our customers. We should support and promote efforts to provide interpretive personnel on board public transportation vehicles bringing visitors to the Forest. By providing interpretation and information about the sensitivity of the rain forest, we can also help achieve managerial objectives such as reducing litter, keeping visitors on trails, and keeping them out of sensitive habitats. etc.

Forest visitors were asked: ***“If a large visitor center which provided natural history displays, movies, and other programs were located at El Yunque, would you be willing to pay to visit the center?”*** Eighty-nine percent of those who responded, said that they would be willing to pay to visit the center.

Interpretation

If we have a quality product to present, people will be willing to pay for it. Visitors coming to El Yunque are interested in learning more about rain forests.

Managerial Implications/Recommendations

Our customers are interested in visiting a center where they can learn more about El Yunque. With our concern about people and traffic congestion in the Forest, we can use the visitors' interest in a Visitor Center as an incentive for them to use an alternative transportation system to get there.

El Portal Front End Evaluation

The El Portal Front End Evaluation (EPFEE) was developed to provide information on the visitors' existing knowledge, cultural themes, and information needs that could be associated with the development of a visitor center.³ The use of it here is pertinent because it gives a profile of what El Yunque means to its visitors. This information can be used to make a case about what services we should be providing and how. Most of what the EPFEE presents was developed through analyzing and drawing conclusions from the CUSTOMER report. The EPFEE process however did include additional interviews including 114 local visitors, 78 international visitors, 12 employees and 9 children. These interviews were conducted at 10 of the most frequented locations on the Forest, most of which are accessed via PR-191.

Profile of an International Visitor

- Most spend an average of two hours at El Yunque.
- The highlight of their experience is to be able to see the beauty of nature, one that is preserved and conserved by the Forest Service.
- Waterfalls and the vista are the next order of key aspects of their visit.
- They want the Forest preserved and conserved or "left as it is".
- They want to improve their forest experience by enhancement of information including the provision of guided tours.
- They would like to see management widen the road (some did not appreciate the experience of narrow curvy roads up the mountain).
- Their image of the Forest is "green", vegetation, trees, rain and simply nature's beauty.
- They feel the Forest is a source of health, peace, relaxing atmosphere and freedom.

Profile of a Local Visitor

- Their visit to El Yunque may last a whole day.
- The highlights of their experience is contact with nature, benefiting from clean cool air and enjoying the water and swimming.
- Other key aspects of their visit are contact with waterfalls and rivers, enjoying vistas, and the beauty of the Forest.

³ Manual Valdes Pizzini, Alfonso Latoni, Virgilio Rodriguez, Fernando Silva, "El Portal Front End Evaluation of Visitors," 1992, p.1.

- El Yunque is used to get out of the urban world, to flee the city; to find peace.
- El Yunque provides an opportunity to share with family and friends, teach the children and bring back memories.
- They would like more availability of rest rooms, telephones, potable water and food services.
- Playgrounds for the children are desired, as is easier access to the rivers and streams.
- Their image of the Forest is described with the words air, pure, cold, cool and the concept of peace and relaxation.
- El Yunque is associated with being “the lungs” of Puerto Rico and as protection against hurricanes.
- El Yunque represents a symbol of patrimony.
- El Yunque also holds religious and spiritual significance

During interviews, local visitors showed concern about the volume of traffic on the road, although this may be because interviews were conducted during the Fourth of July weekend. Additional parking was mentioned as a need and some even recommended a trolley or other form of mass transit within the Forest. Visitors commented on the negative impact of cars to the environment.

One aspect of the EPFEE included interviewing Forest Service employees. They were asked what services visitors request most. Their responses included food services, parking, and public transportation in the Forest.

Visitor Volume by Season and Days of the Week

Although there is only limited data recorded and available on the volume of visitation that occurs on El Yunque, what we have is enough to conclude that:

- Most visitation to the Forest occurs during weekends, and is especially high on Sundays.
- Visitation to El Yunque increases during the Summer and the change is most dramatic during July.

Figure-12 and Figure-13 provide an idea of the changes that occur by days of the week and months of the year.

Visitor Volume by Days of the Week

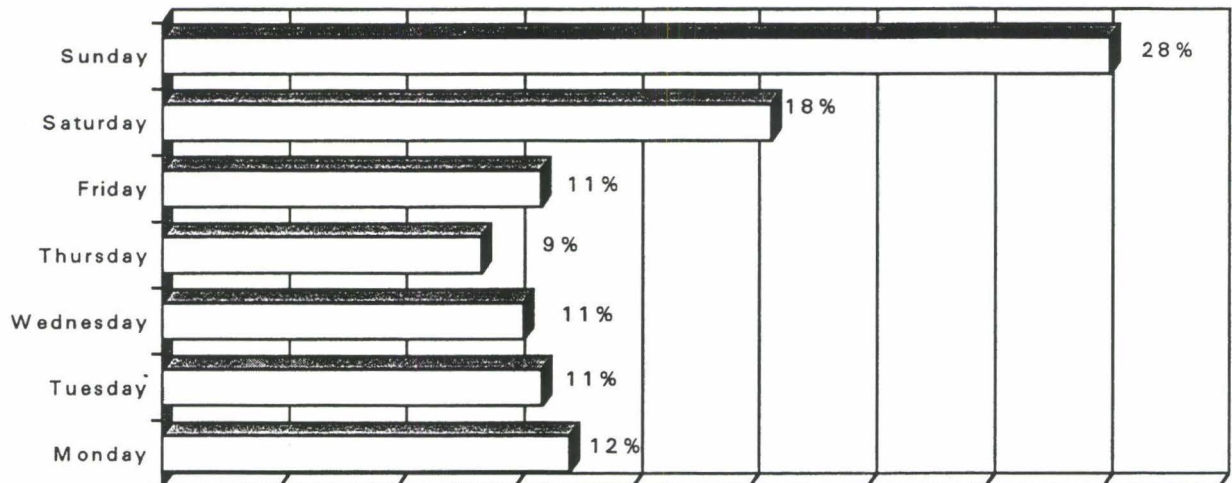


Figure -12

Visitation Volume by Months of the Year

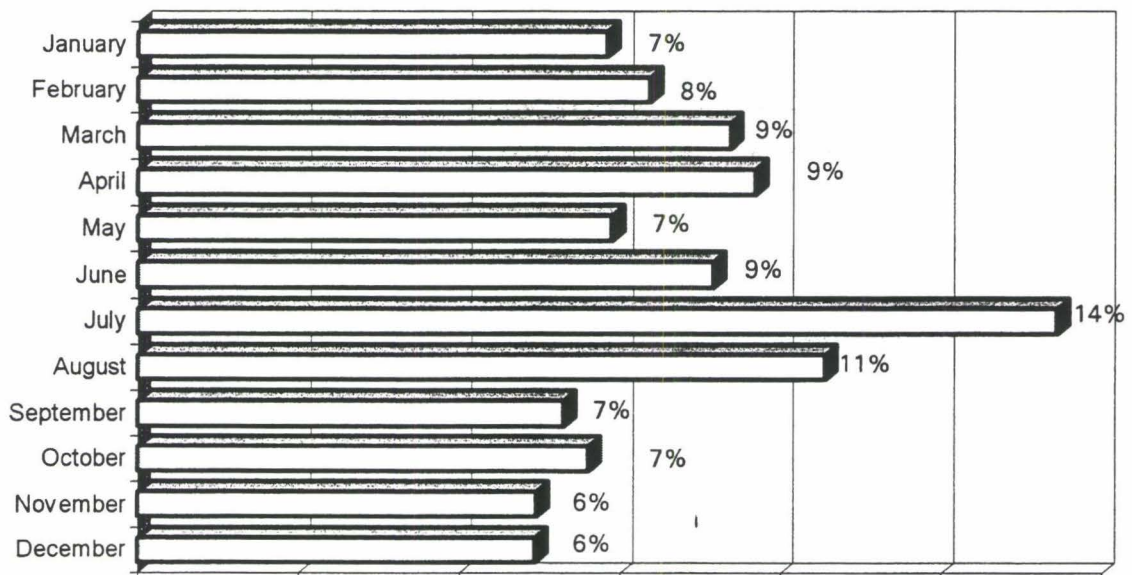


Figure - 13

Interpretation

Although the numbers for Saturday visitation are higher than weekdays, local custom dictates that family outings, for the most part, are reserved for Sundays, hence the highest visitation occurs then. During the Winter, international visitation is at its highest with local visitation at its lowest. Summer months show a major increase in use by locals due to children being out of school and the search for relief from magnified urban summer temperatures. July by far receives the highest use due to the Fourth of July holiday and because July is one of the hottest months of the year on the Island.

Managerial Implications/Recommendations

Staffing on the Forest should be increased to manage higher use occurring during the weekends. This becomes especially important during the summer. During days of excessively high use, the Forest is inundated with vehicles and visitors. This situation puts a strain on Forest resources, facilities, personnel and even customers. Although managerial controls should be used as a last resort, they should be implemented if it means the difference between protecting the Rain Forest and allowing environmental degradation. The single most beneficial action that can be taken to relieve congestion on the Forest, is to implement an alternative transportation system that would require visitors to leave their cars outside the Forest. Such a system may only be needed seasonally or on weekends. International visitors brought to the Forest by Outfitter Guides on tour buses represent a large number of visits throughout the year. Visitors should be brought to the Forest in smaller vehicles that are softer on the land. Tours should be scheduled with the FS to avoid too many buses in El Yunque at the same time. Large passenger buses are much more capable of causing congestion due to their size and limited maneuverability the curvy and mountainous PR-191. The FS must also provide facilities of similar development in other parts of the Forest to pull visitors away from the PR-191 corridor.

Vehicular Volume by Days of the Week and Time of Day

Figures-14(a)(b) through 16(a)(b) represent a very recent tally of transit into the Forest via PR-191 on four separate days. They show the types of vehicles entering and also the volume of traffic by the time of day. Since these inventories were taken during the Spring, they do not reflect the higher number of vehicles typical of Summer months, but do give a good indication of the overall difference between the days of the week. The records presented are from a Wednesday, Saturday, and Sunday. Vehicle counts were taken between 9:00 AM and 4:00 PM.

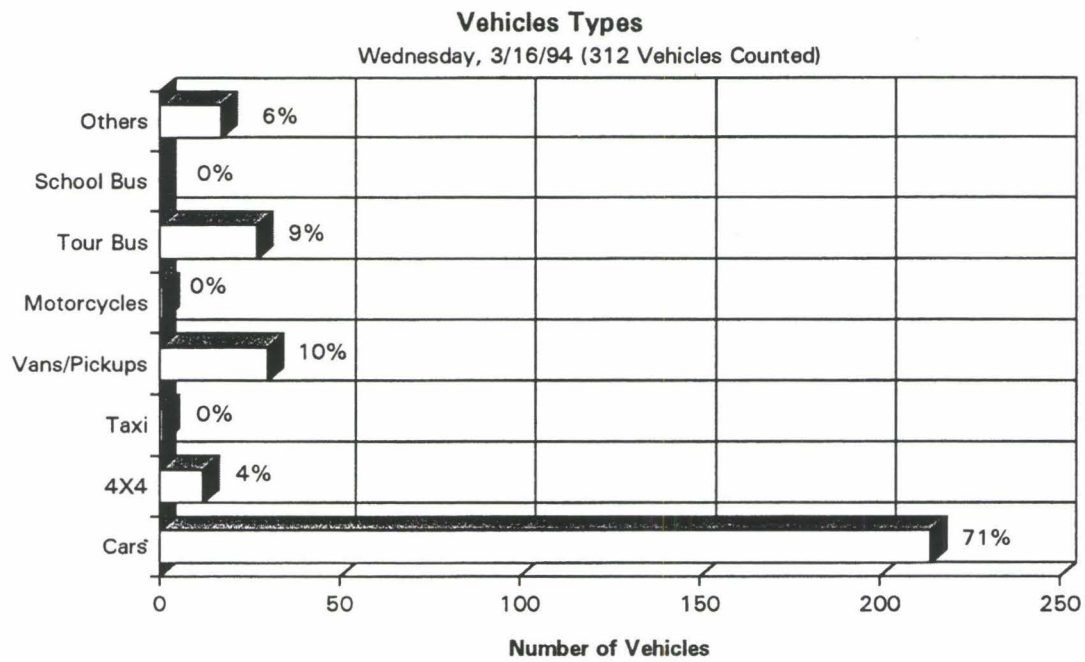


Figure - 14a

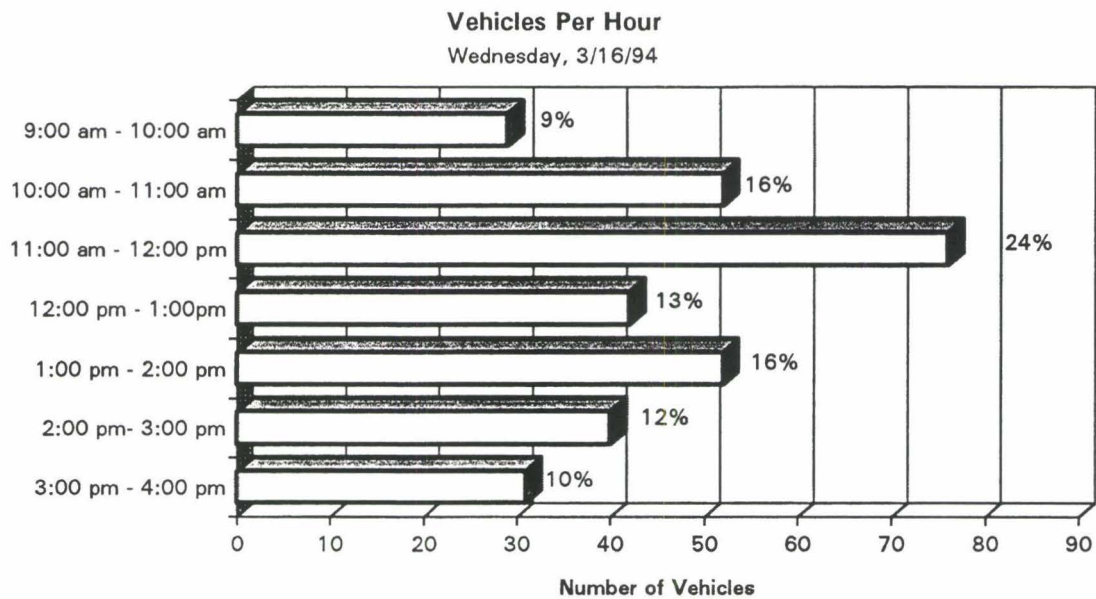


Figure 14b

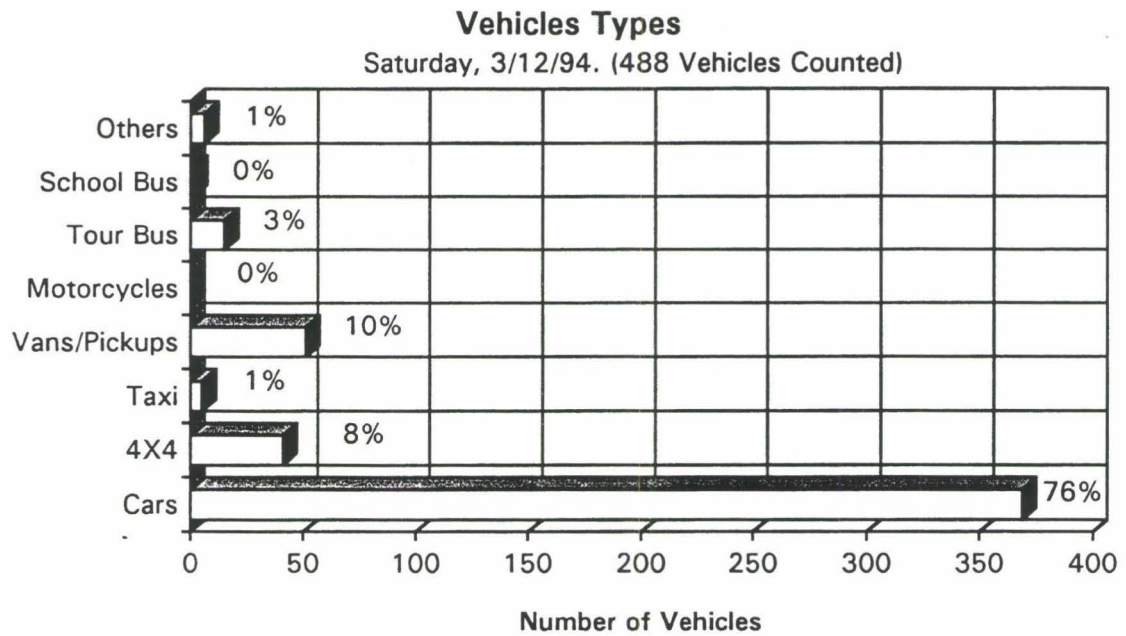
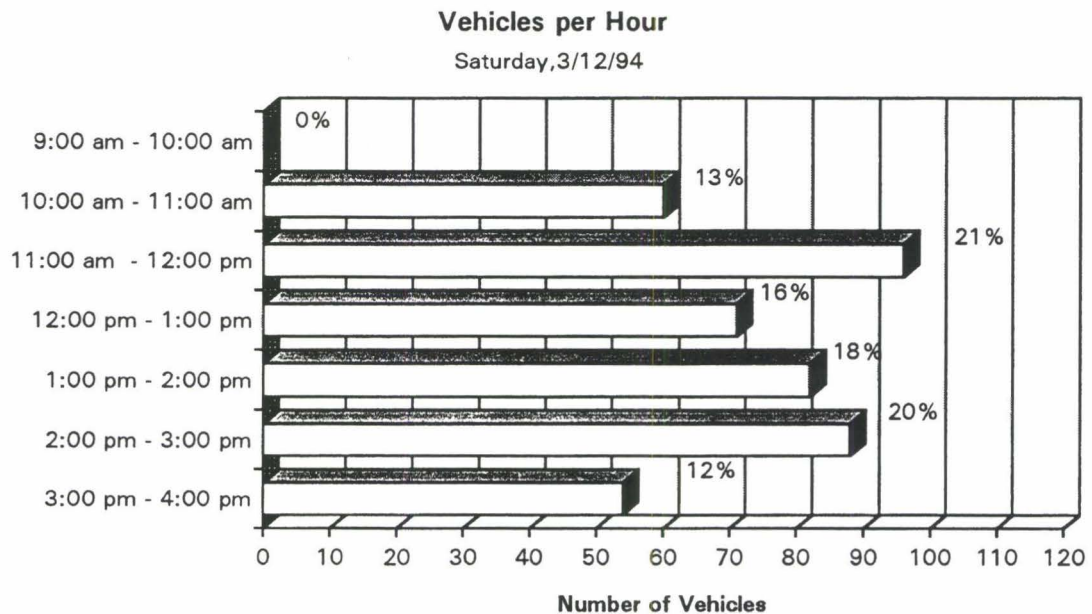


Figure - 15 a



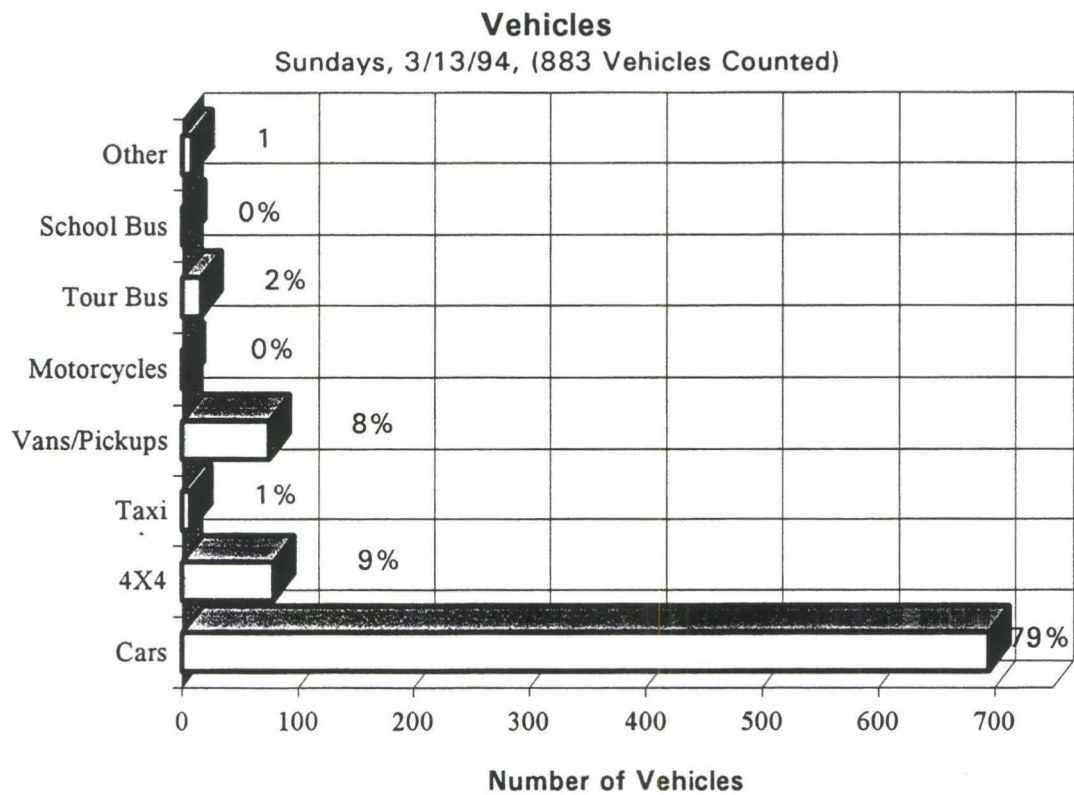


Figure 16a

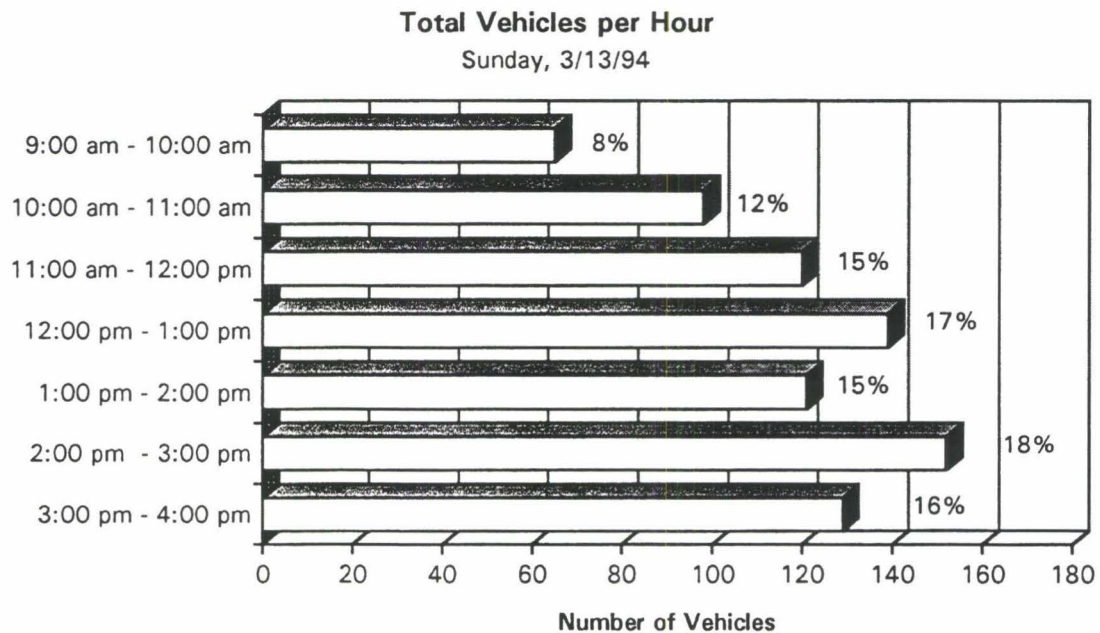


Figure - 16b

Interpretation

This data provides further evidence that use of personal vehicles is by far the most common form of transportation to the Forest. The percentage cars is even greater during the weekends. Studying the data more in detail revealed that tour buses visit the Forest in the cooler morning hours or after lunch, and that they visit the Forest less on the weekends. In general there is marked increase in transit on PR-191 between 10:00 AM and 4:00 PM.

Managerial Implications/Recommendations

Since visitation to the Forest increases dramatically on weekends, our field people should be scheduled so that they are present on those days to monitor access and to reduce practices that create safety hazards. If management controls are considered, it may be effective to establish an allowable vehicle number limit for the PR-191 recreation corridor. We should work with the tour bus outfitter guides to stagger their schedules so that no more than a set number of buses are on the mountain at any one time. We can consider establishing a formal "visitor hour" for tours only. Any form of alternative transportation should be scheduled to accommodate the busiest days of the week and times of day. With the heavy reliance on personal vehicles to visit El Yunque, an alternative transportation system would alleviate the problems caused by an excess number of vehicles within the PR-191 recreation corridor.

Recreation Facilities And Parking Within The PR-191 Recreation Corridor.

All developed recreation sites in El Yunque, (those with toilet facilities and potable water) are located along the PR-191 recreation corridor. Table-1 below lists the existing sites most visited by our customers. Proposed new facilities are shown in *italics*. Also shown is the amount of official and non-official "overflow" parking used along PR-191.

INTERPRETATION AND INFORMATION	PAOT	OFFICIAL PARKING	NON-OFFICIAL PARKING
Palo Colorado Visitor Information Station	20	*	
Sierra Palm Visitor Information Station	30	*	
El Yunque Ranger District	10	20	
<i>Stone House Interpretive Site</i>	30	4	
Subtotal	90	24	0
PICNIC AREAS			
Palo Colorado *	296	54	21
Caimitillo	80	13	
Sierra Palm *	160	31	
Subtotal	536	98	21
OBSERVATION SITES			
Yokahu Observation Tower	100	36	10
Mt. Britton	25	0	
La Coca Falls	40	20	
Baño Grande	30	10	
Baño de Oro	20	*	
El Yunque Peak Tower	25	0	
Los Picachos	25	0	
Cabezas de San Juan	14	6	4
Subtotal	279	72	14
TRAILHEADS			
Mt. Britton	60	15	8
Big Tree	91	26	15
La Coca	15	5	
Subtotal	166	46	23
Additional Unofficial Parking Along PR-191			92
Grand Total	1071	240	150

*Accounted for in Picnic Areas

Table-1

Interpretation

With anticipated limited capital investment budgets, the number of facilities within the PR-191 recreation corridor will only increase slightly over the next 10 years. The existing facilities can accommodate more People At One Time (PAOT) than what the official parking lots can supply, using 3.5 per vehicle, which is the FS standard "rule of thumb".

When unofficial overflow parking is included in this calculation, site capacities are easily exceeded. We do not need more facilities within the recreation corridor. The existing facilities are more than enough to satisfy the number of visitors limited by the amount of official parking. As a whole however, the Forest has a small amount of recreation site development in comparison to the demand for such sites and for the amount of visitation it receives.

Managerial Implications/Recommendations

An alternate transportation system would allow full use of existing site capacities without causing environmental impacts to the resources. If visitors do not have the type of facilities they desire elsewhere, they will continue using the ones that are available. We must concentrate on developing new sites in other areas if we wish to redirect recreation use. By building functional and attractive facilities elsewhere we will pull and not push visitors to other less crowded and impacted areas.

Description of Alternatives



Description of Alternatives

The alternatives considered in this study range in scope of change and action from a "No Action" alternative, to the "Mandatory Trolley" alternative, where all visitor travel within the PR-191 recreation corridor would be on board high occupancy transit vehicles.

No Action Alternative

Under this alternative, management of access into the Forest via PR-191 would remain the same. Restrictions on access would only occur on a case by case emergency basis such as when the PR-191 corridor becomes overly congested or when there is a hazard threatening visitors' health and safety.

Alternative-A (Managed Access)

Alternate Transportation Mode - Transportation to El Yunque would continue to be by personal vehicles or tour buses.

Access Control - Access to El Yunque would be regulated. At the intersection of PR-191 and PR-966, the Forest Service (FS) would maintain an operational road closure gate to regulate the number of vehicles entering the PR-191 recreation corridor.

Forest managers would monitor the number of vehicles entering the Forest until the pre-established limit is met. After that time, visitors in their vehicles would only be allowed beyond the closure gate as other vehicles exited the recreation area.

Tour bus operators would be required to run their tours on a schedule coordinated with the FS.

On known busy holidays and weekends, tour buses would not be allowed access to the PR-191 recreation corridor but would be allowed to the El Portal Tropical Forest Center (EPTFC). Outfitter guides would be made aware of these dates.

A picnic site reservation system would be put into effect with special parking privileges assigned.

At no time would visitors on bicycles or walking be restricted from the area.

Time of Year Management Controls in Effect - During the summer season and on designated holidays and weekends known to be days of heavy visitation.

Additional Managerial Actions - Signs would be erected at strategic locations to alert the public that regulating of access is in practice. The FS would work closely with the media to promote and explain the purpose of these management actions.

Alternative-B (Voluntary Shuttle Bus)

Alternate Transportation Mode - The vehicles in this alternative would be the "mini-bus" type commonly used to bring visitors to the Forest by some Outfitter Guides. Use of the shuttle bus system would require paying a \$2.00 adult fare. Since its use would be voluntary, incentives would be provided to encourage visitors to use it. The mini-buses seat from 18 to 24 passengers comfortably. Visitors bringing supplies and equipment for picnics would be provided space on the shuttle designated for that use.

The two dollar fare is suggested for several reasons. In the visitor surveys discussed in the previous section, responses show that at present visitors are not willing to pay more than \$2.00 for public transportation to the Forest. Locals are used to paying \$1.00 in the "Publicos" to travel between San Juan and many outlying communities. Since the use of the shuttles would be voluntary, too high of a fare may discourage its use.

Time of Year in Operation - The shuttle bus system would be operational during the summer, weekends and all peak visitor use holidays.

Schedule and Stops - The shuttle bus would run approximately every half hour even if they are not full. This would be necessary to serve visitors waiting to be shuttled to other points along the recreation corridor or back to the transportation center. Hours of operation would be scheduled during times of the day when most Forest visitation occurs.

The shuttle buses would travel up PR-191 and make its first stop at EPTFC. From there it would continue up the mountain and stop at all the major recreation facilities and attractions. Visitors parked at the EPTFC would not be allowed to board the shuttle bus. This policy would be used to avoid having the EPTFC become a parking lot for those recreating in other areas. Passengers who board at the transportation center would be given a ticket that allows them to board the shuttle bus as many times as they wish on that day.

The shuttle bus would be available to make special, as needed trips and pick-ups to Puente Roto, a very popular undeveloped recreation site used by local residents.

Access Control - Regular access to El Yunque would not be restricted or regulated in any way except when traffic congestion levels threaten the health and safety of visitors. The Forest Service (FS) would maintain an operational road closure gate at the intersection of PR-191 and PR-966 that could be put into use if needed.

On Fourth of July, Labor Day, and other traditionally busy holidays, special access controls would be implemented. Forest managers would monitor the number of vehicles

entering the Forest until the pre-established limit is met. After that time, only visitors on shuttle buses would be allowed beyond the closure gate. Vehicles would be allowed past the gate only as other vehicles exit the recreation area. On these days, tour buses would not be allowed access to the PR-191 recreation corridor, but would be allowed to the EPTFC which is located before the road closure gate.

Tour bus operators would be required to run their tours on a schedule coordinated with the FS.

Large passenger tour buses would not be allowed into the PR-191 recreation corridor when shuttle buses are operational.

A picnic site reservation system would be put into effect with special parking privileges assigned.

At no time would visitors on bicycles or walking be restricted from the area.

Additional Managerial Actions - As an incentive for visitors to use the bus shuttle service, the FS would offer free entry to El Portal Tropical Forest Center or tickets to one of its special programs. The FS would also provide interpreters on board the mini buses to share insights about the Forest and information about things to do. As an additional incentive, arrangements would be made with local businesses, including those along the PR-191 corridor, to offer free refreshments to those who use the shuttle bus.

Signs would be erected at strategic locations to alert the public of the option and benefits of using the shuttle bus system. The FS would work closely with the media to promote and explain the alternate transportation mode.

Location and Description of Transportation Center - The Transportation Center would be located close or within the community of Palmer. It would consist of a 50 to 75 car capacity secured parking lot, a passenger loading zone, plus minor amenities. There would also be space for 4 large tour buses. Since use of the alternative transportation system would be voluntary most of the time, the center's attractiveness and available services would be very important to attract people to use it. Parking would be free.

Local Community Participation - With participation from the FS, the "El Yunque Transportation Council" (EYTC) would be formed to represent the FS, the community of Palmer, and all other interested and affected parties. The EYTC would plan and organize all aspects of the transportation system and center including how they would be promoted and operated. The fare charged for riding the shuttle bus would also be controlled by the EYTC.

Mini buses would be operated by a community coop or a concessionaire.

Alternative-C (Mandatory Trolley)
 (This is the "Preferred" Alternative)

Alternate Transportation Mode - The vehicles in this alternative would be a combination of mini buses and trolleys. Mini buses would be used to take visitors from the transportation center to the Forest boundary where EPTFC is located. From there, trolleys would be used. Use of the trolleys to enter the PR-191 recreation corridor would be mandatory during its schedule of operation, and would require having to pay a \$3.00 adult fare for the round-trip between Palmer and the Forest. These trolleys would be of the size and character similar to those found at the Cuevas de Camuy Visitor Complex in North central Puerto Rico. The trolleys are pulled by a heavy duty tractor type vehicle that has the power and maneuverability to pull two passenger cars up the curvy PR-191 road. Each passenger car can transport up to 18 visitors. Use of one or two cars would depend on the volume of use at the time.

The three dollar fare would need to be marketed as an introductory fare since it would be unlikely that the trolley operator could turn a profit at that rate. The temporary low fare would also be necessitated for the same reasons discussed in Alternative "B". In addition, this alternative may have visitors already having to pay for secure parking. It would be logical to work out a fare that includes parking privileges and transportation to El Yunque.

Visitors bringing supplies and equipment for picnics would be able to use the trolley system with no problems since space would be designated on the trolley for that use.

Voluntary use of the Trolley has not been considered because they could not safely or efficiently run with other traffic on the road. During periods that the trolley is not running, the shuttle buses would be available for voluntary use. They would travel all the way into the PR-191 recreation corridor.

Time of Year in Operation - The trolley/mini-bus system would be in operation during the summer, all weekends and during designated holidays known to be days of high visitation and the mini buses would be available at all other times.

Schedule & Stops - The shuttle buses would depart the transportation center every half hour and the trolleys would depart every 15 to 30 minutes depending on the volume of users. The system would be run in a manner that would assure reliable arrival at all designated stops at least every half hour. Hours of operation would be scheduled during times of the day when most Forest visitation occurs.

The trolley route would initiate at the EPTFC would travel up PR-191. Visitors parked at the EPTFC would not be allowed to leave their cars and board the trolley. This policy would be to avoid having the EPTFC parking lot become a recreation corridor parking area. Passengers who board the shuttle buses at the transportation center would be given a ticket that allows them to board the trolley as many times as they wish on that day. The



trolley would travel up PR-191 and would not stop until it passes the intersection of PR-191 and PR-966. This point marks the beginning of the recreation corridor. Stops would include all popular recreation facilities and features including trailheads. (See Map Section). Stops would also be made at local business on the route offering food and refreshments.

Access Control - During its scheduled operation periods, the trolley would be the only way to visit the PR-191 recreation corridor at El Yunque. The FS would maintain access regulating personnel at the intersection of PR-191 and PR-966. The only vehicles allowed beyond the closure gate would be the trolleys and those carrying on duty FS personnel. Prior arrangements would be made to allow vehicular access to those with rights or business beyond the gate such as private property owners or on duty employees of companies with interests in the regulated area.

When the trolley is not in operation, access to the PR-191 recreation corridor would be allowed as it would under the *No Action Alternative*, except that the shuttle bus would be available for voluntary use.

Tour buses would not be allowed access to the PR-191 recreation corridor but would be allowed access to EPTFC. Tour bus customers would be able to board the trolley system from the EPTFC for a guided tour. An agreement would be made with the tour bus operators and the trolley administrators to facilitate the use of the trolleys from this location. Visitors arriving in the tour buses would not have to pay a second fare for the Forest trolley since it would be already included in their tour bus fee.

Tour bus operators would be required to run their tours on a schedule coordinated with the FS.

When the EPTFC bus parking lot is full, tour bus operators would be required to make use of the Transportation Center outside the Forest.

A picnic site reservation system would be used with special parking privileges assigned. At no time would visitors on bicycles or walking be restricted from the area.

Additional Managerial Actions - The FS would provide interpreters on board of the trolleys at all times. A PA system would be used to share interesting facts about the Forest and to give information about things to do and see in the area.

To avoid conflicts with other vehicles and for safety considerations, the trolleys would travel within special lanes designated for their use.

Signs would be erected at strategic locations to alert the public of the requirement to use the trolley system during its scheduled time of operation. The FS would work closely with the media to promote and explain the trolley transportation system and the reason for the use of an alternative transportation mode.

Arrangement would be made to schedule special tours from EPTFC to the seldom seen "Dwarf Forest" which is usually closed to visitors.

The FS would begin to allow guided tours buses to enter El Yunque from the South side. This would be the only way visitors could enter the closed area without having to walk. This would be done in an effort to draw visitors to the south side of the Forest and stimulate their economy.

Location and Description of the Transportation Center - The Transportation Center for the trolley system would be located near the community of Palmer. Although under this alternative, the use of the trolley system would be mandatory for all Forest visitors, the transportation system would be much more desirable and accepted if the terminal facilities were inviting and service oriented. The FS would have interest in making sure that visitors receive good service and that the image presented at the center is compatible with what the FS wishes to portray.

The Transportation Center would be at the scale and development level similar to that envisioned by those preparing planning documents aimed at fomenting the revitalization and economic development for Palmer.

The vision for this Transportation Center would include:

- Facilities to house and maintain trolleys and mini buses
- Formal Parking for 150 cars and 3 Large Buses
- Overflow Parking for 100 cars and 3 Large Buses
- Restroom Facilities
- Food Services
- Souvenir Shops
- Local Arts and Crafts
- Well Defined and Functional Trolley Passenger Loading Zone
- Attractive Pedestrian Plazas
- Security

The Transportation Center would be developed in phases and would eventually become a major attraction for Island residents and international tourist. The transportation center, would become a Cultural Center Visitor Complex or "El Pueblito" as a name that has been mentioned for it.

The FS would locate personnel at this Complex to provide information about EPTFC and El Yunque. There would also be information panels erected within the Complex to help orient visitors, to share about the Forest Service and the work going on at El Yunque.

Development of the Transportation Complex would include significant improvements to PR-191 through the community of Palmer which is the main approach to the Forest..

Local Community Participation - As with the previous alternative the FS would be a part of the "El Yunque Transportation Council" (EYTC), which would be formed to represent the FS, the community of Palmer, and all others interested and affected by the development of a Transportation Center or Complex. The EYTC would plan and organize all aspects of the transportation system and center including how they would be promoted and operated. The fare charged for using the system would also be monitored by the EYTC.

Mini buses and trolleys would be operated by a community coop or a concessionaire.

Sustainable economic development for the community of Palmer and the municipality of Rio Grande would be a primary goal.

PR-191 South & Naguabo - A shuttle bus system would be put into effect on the South side of the Forest. The south side shuttle however, would be mandatory for those wanting to see the Forest beyond the gate closure and closer to the slide area. The Shuttle would run much less often and would be managed like a tour. It would offer a different experience to visitors since the South side of the Forest is much less developed. Shuttle bus travel along PR-191 south would take visitors as close to the slide area as safely possible. From that point on visitors would have to walk.

Visitors would get a "ecotouristic" view of El Yunque.

The FS would provide interpreters with knowledge appropriate to the type of experience found on the South side.

The community of Naguabo and the FS would market this shuttle trip as an alternative to the more crowded and developed North side.

The FS would work with the community of Naguabo to stimulate economic development. Together they would promote the natural side of the Forest and the area's less crowded beaches as attractions to draw international tourists and Island residents.

A transportation center would be established in Naguabo at a smaller scale.

Alternative-D (Open PR-191)

Although the likelihood of PR-191 being repaired and open to through traffic in the near future is unlikely, the following alternative is presented as a model of what could be done to reduce traffic within the PR-191 recreation corridor if it was open.

Alternate Transportation Mode - With PR-191 open to through traffic, transportation to the PR-191 recreation corridor would be via all forms of vehicles and on a shuttle bus system similar to the one described in *Alternative-B*. Use of the shuttle system would be

voluntary but incentives would be provided to encourage visitor use. A \$3.00 adult fare would be charged due the longer distance of its route.

Time of Year in Operation - This shuttle bus system would be under operation all year.

Schedule and stops - The shuttle buses out of Palmer would run every half hour and would make stops as described in *Alternative B*. Alternate buses out of Palmer would travel all the way to Naguabo.

The mini buses out of Naguabo would run every hour and would stop at points of interest on the South side of the Forest, at all the featured sites along the PR-191 recreation corridor, would continue to EPTFC, and would end at Palmer.

Riders of the shuttle bus system would have the option to stay on the Forest or travel to either community on the same ticket. A return ticket would have to be purchased if users choose to travel all the way to the other terminal.

Access Controls - On known heavy visitation days, the FS would request authorization from highway authorities to close the road to other than a set number of recreation users. On these days, large passenger tour buses would not be allowed into the PR-191 recreation corridor and on all other days, tour bus operators would be required to run their tours on a schedule coordinated with the FS.

The FS would monitor its own parking lots but would need heavy assistance from Highway Patrol Officers to maintain the roads clear of hazard-causing and illegally parked vehicles.

A picnic site reservation system would be put into effect with special parking privileges assigned.

At no time would visitors on bicycles or walking be restricted from the area.

Additional Managerial Controls - Same as *Alternative-B*

Location & Description of Transportation Centers - In Palmer, it would be located and have the character as described in *Alternative-B*. On the South side, it would be located near or within the community of Naguabo and would be enough for approximately 20-30 cars plus facilities for visitor services.

Community Participation - As in *Alternative-B*, each community, with participation of the FS, would form a special council to oversee the development and promotion of the alternative transportation system.

Mini buses would be operated by a community coop or a concessionaire.

Coordination and cooperation between the two communities would be essential since shuttle buses and their drivers would share each others facilities.

The primary goals would be to promote sustainable economic development for each rural community.

None of the alternatives described suggests the mandatory use of an alternative transportation mode 100% of the time. Such an operation would not be profitable by itself during periods of low visitation to El Yunque.

It is recognized that the \$2.00 and \$3.00 adult fares suggested would not provide much opportunity for profit by those operating the system. The concept however, is that visitors would stimulate the economy by making purchases and using other provided services. It is here where entrepreneurship would come into play. As already mentioned, the low fares should be considered a marketing strategy to give the public an opportunity to get use to the idea of paying to visit El Yunque.

All of the alternatives developed except for "D" should be considered as combinable to form new alternatives. Care was taken to not propose unrealistic actions on the part of the FS since we are limited to the amount of regulating we can do. In addition, knowing that El Yunque holds a special value for the people of Puerto Rico requires sensitivity when trying to produce a balance between environmental conservation and social customs and needs.

Alternatives At A Glance**ALTERNATIVES**

Components of Alternatives	<u>Alternative-A</u> Managed Access	<u>Alternative-B</u> Voluntary Shuttle-Bus	<u>Alternative-C</u> Mandatory Trolley (Preferred Alt.)	<u>Alternative-D</u> Open PR-191
<i>Alternate Trans. Mode</i>	None	Mini-Bus Shuttle	Trolley & Mini-Bus Shuttle	Mini-Bus Shuttle
<i>Use Option & Fare</i>	N/A	Voluntary \$2.00	Mandatory \$3.00	Voluntary \$3.00
<i>Time of Year in Operation</i>	N/A	Weekends, Summer & Holidays	Weekends, Summer & Holidays	Year-Round
<i>Daily Schedule</i>	N/A	Runs continuously every half hour	Runs continuously every half hour on North side & as demand requires on South Side	Runs every half hour on Palmer side and every hour on Naguabo side
<i>Management Access Controls</i>	Use of closure gate while monitoring. + Picnic site reser. system	Use of closure gate while monitoring. + Picnic site reser. system	No access to other than Trolleys + Picnic site reser. system	Use of closure gates while monitoring if Hwy. Author. allows + Picnic site reser. system
<i>Time of Year Management Actions in Effect</i>	Summers, & Historically busy Holidays and Weekends	Historically busy Holidays and Weekends	During Trolley schedule of operation	Historically busy Holidays and Weekends
<i>Tour Bus Access</i>	Yes, but when Rec. Corridor is full, no buses + Tours will be coord. with FS	Only mini buses when they are in operation + Tours will be coord. with FS	No tour buses allowed when Trolleys are in oper. + at all other times, tours will be Coord. with FS	No controls on regular days but would be restricted on peak visior days, or as Highway Authority would allow
<i>Location & Description of Trans. Center</i>	N/A	At Palmer, parking for 50-70 and basic services	Palmer, elaborate Transportation Complex with parking for 150+ cars, food services, etc.	At Palmer, parking for 50-70 and basic services Same at Naguabo but only parking for 20-30
<i>Community Participation</i>	N/A	Form action council to oversee trans. system and facility, plus option to operate mini-buses	Form action councils at both commun. to oversee trans. sys. and fac., plus option to operate. trolleys & mini-buses	Form action council at both communities to oversee trans. system and facilities, plus option to operate. mini-buses

Impacts of Alternatives



Impacts of Alternatives

No Action Alternative

Environmental Impacts - Doing little to control the access of vehicles and visitors into the recreation corridor would continue to place a strain on the environment, especially next to the road. Vegetation would be damaged and not allowed to regenerate, soils would be compacted and eroded, and the Forest's visual character would be degraded on days when vehicles dominate the scene.

Social Impacts Within the Forest - Visitors would be allowed to use the Forest as they have done traditionally. The quality of their experience would continue to be challenged by overcrowding of vehicles and people on days of heavy visitation. Health and safety of the visitors would be threatened when congestion reach levels that force use of the road for pedestrians and reduce driver visibility. Visitors would not receive adequate service, information, or attention from FS personnel. Other services identified as desirable would not be available.

Managerial Impacts - Costs of implementing this alternative would increase every year with resource protection measures and rehabilitation continuing to be a drain on operational dollars. Facility maintenance and repair costs would also continue to increase and would put a stress FS personnel resources. Frustration would be high from not being able to serve the public and protect the environment adequately.

Socioeconomic Impacts on Rural Communities - Local rural communities would have limited opportunities to improve their economic situation. The quality of life and physical character of the Forest's neighboring communities may not improve significantly.

Alternative-A (Managed Access)

Environmental Impacts - Degradation of the Forest resources near PR-191 and around the most use recreational facilities would be substantially reduced. The Forest's visual character and ambiance would be more natural.

With the picnic site reservation system, the numbers of people at normally high density sites would be controlled, hence reducing impacts in the area.

Social Impacts Within the Forest - Visitors would show some resistance to access policy changes. Unlike in the past, visitors would have to plan their trips to El Yunque, knowing that on heavy use days access would be limited.

Vehicular and visitor congestion would also be reduced. Opportunity for a quality Forest experience would increase. Customer satisfaction would improve with better access to



Forest information and with properly maintained facilities. Social interaction and conflicts would be less.

Managerial Impacts - An increase in FS or volunteer personnel would be necessary during periods of access control. Dealing with the public would be challenging until visitors become accustomed to new policies.

It would be essential that the FS use all forms of media available to communicate information about access policy changes and to explain its purpose and benefits.

When the recreation corridor becomes saturated, a system may be needed to notify visitors on their way up to the recreation area that they may not be given access unless they are willing to wait for an indefinite period. Signage could be used to help achieve this goal.

A process would need to be set up to manage picnic site reservations and to make sure they are respected at the picnic areas.

Cost of implementing this alternative would be limited to signage and personnel needed to implement the access control policy. These costs could be offset by reduced maintenance and needs for repairs. Law enforcement officers could be needed to help enforce the access control policy during its introduction.

Facility improvements and construction would eventually be needed in other parts of the Forest to satisfy the needs of displaced visitors. FS personnel would need to be ready to respond to inquiries about alternative locations to recreate.

With limited numbers of visitors in the Forest, FS personnel would be less strained and would be able to give better service which in turn would provide better job satisfaction. They would also be able to provide better cared facilities and a healthier Forest environment.

Socioeconomic Impacts on Rural Communities - This alternative would do little to provide opportunities to the Community of Palmer. Less visitation to the Forest due to access control may even be slightly detrimental since purchases of supplies and use of services in the community would be reduced.

With no access restrictions on the South side of the Forest, the community of Naguabo could become the recipient of economic benefits resulting from an increase off use on that side. This opportunity for Naguabo could easily improve if the FS actively recommends and redirects use to the South side. Construction of FS facilities on the South side could stimulate Naguabo's economy even more.

Alternative-B (Voluntary Shuttle Bus)

Environmental Impacts - Negative impacts on the Forest environment would be reduced but not as much as with *Alternative-A* since use of the Shuttle buses would be voluntary most of the time. With access control in effect on peak use days, there is less likelihood that the Forest would become congested to the point of damaging the natural resources.

Interpretive messages on the shuttle buses would include a message about the Forest's sensitivity and the need to "Leave the Forest as You Found It". Visitors would be less incline to litter or take part in other depreciative behavior.

As with the previous alternative, implementation of the picnic site reservation system will reduce the numbers of people at normally high density sites. This would also help minimize impacts in the area.

Social Impacts Within the Forest - This alternative would allow flexibility for the visitor to use the shuttle if they desire. Being given a choice would be much more acceptable to visitors. With the shuttle in operation at the designated times, the Forest will be accessible to whole new segment of visitors not able to reach El Yunque before. These are people who do not have access to a personal vehicle.

Social interaction would increase on the buses. More visitors would be walking within the Forest to reach desired facilities or features. There will be initial resistance to access control, however being allowed into El Yunque by shuttle bus even if parking is saturated will help ease hard feelings.

Some visitors parked at El Portal Tropical Forest Center (EPTFC) would experience frustration from not being allowed to use the shuttle buses to travel to El Yunque. This policy would avoid visitors leaving their vehicles at the EPTFC parking lot for hours at a time.

The \$2.00 fare charged for using the shuttle would be minimal enough that the added service of being provided interpretation and free tickets to special programs at EPTFC would more than offset the cost.

Forest visitors would be given a "view" of El Yunque from an interpreter's perspective. This would allow them to see and understand the Forest as they may never have before.

Having tour bus operators schedule their visits to the Forest will avoid an excess of large and small tour buses from being on the PR-191 recreation corridor at the same time. Possibilities of congestion and traffic hazards caused by an excess of buses would be reduced.

Managerial Impacts - When the Forest goes into its controlled access mode, the impacts would be similar to those of *Alternative-A*. The FS would need to have regular or volunteer personnel ready to implement access controls at a moments notice. It would be a

daily task by field personnel to monitor the need to go into controlled access mode. A mechanism would have to be developed to notify the public coming towards the recreation corridor that the Forest is saturated and that they may have to wait to be let in.

Shuttle buses would be given priority in traffic situations and they would need to be provided with designated boarding and drop-off areas for passengers at each major recreation facility and feature.

Use of the media will be essential to notify the public when El Yunque will be under controlled access management and when unexpected high visitation forces the implementation of it.

A process would need to be set up to manage picnic site reservations and to make sure they are respected at the picnic areas.

Managerial costs for implementing this alternative would be limited to increased personnel needed to manage access control on designated days and on occasions when unexpectedly high use is experienced. The cost of providing interpreters would be minimal if volunteers from the interpretive association are used. Some additional costs may result from needing to make minor physical modifications at shuttle stops to accommodate boarding and drop-off areas.

Socioeconomic Impacts on Rural Communities - The opportunities for rural economic development would increase for Palmer. Since the shuttle will be optional most of the time, the community of Palmer would have to work towards developing an attractive Transportation Center. Visitors would need a reason for stopping there, other than to board a shuttle. Palmer's El Yunque Transportation Council (EYTC), would be able to decide how best to run the shuttle bus system for growth and profit. The sale of supplies, food, and souvenirs, would contribute to create jobs and economic growth for Palmer.

With this alternative, the FS is creating a market for services that don't exist. How effective Palmer is at exploiting this opportunity will depend on the planning and execution of entrepreneur ideas and ventures. The FS would be a partner from the perspective of making sure the customers health and safety is protected and fair services are provided.

Alternative C (Mandatory Trolley)

Environmental Impacts - Under this alternative, El Yunque's environment would benefit significantly from stringent access controls during the time of year the trolley system would be in operation. Impacts to its natural resources would be limited to sites that experience high density use such as popular picnic areas. Even so, the numbers of people at these sites would be controlled by a picnic site reservation system.

Interpreters on the trolleys would be educating the public about rain forest sensitivity which would decrease the likelihood of depreciative, environmentally damaging, behaviors.....

All tour buses would be excluded completely from the recreation corridor, reducing noise and air pollution, as well as improving the area's visual character and natural ambiance.

Social Impacts Within the Forest - This alternative would bring the most resistance from visitors that have been used to the traditional open access policy. Not being able to bring their car up to El Yunque would be an inconvenience, especially if they were planning a picnic. As visitors become familiar with the benefits of a vehicle free atmosphere in the Forest, acceptance of the new policy would occur.

When the trolley is in operation, the Forest will be accessible to whole new segment of visitors not able to reach El Yunque before. These are people who do not have access to a personal vehicle. This is very significant since this may cause an unexpected increase in visitation. As a positive, the Forest and EPTFC would be available to those who had heard about El Yunque, but had never been there.

Customer satisfaction would improve from receiving better service, more information and extensive interpretation. The Trolley would provide visitors the flexibility of seeing more sites since they would not have to worry about finding parking. Activities within the Forest would change. The road would be a big pedestrian walkway. Hazards to visitor health and safety would be reduced significantly. Opportunities for bicyclists in El Yunque will be better than ever.

Visitors interaction would take on a different form. Instead of being preoccupied with traffic and the road, Forest visitors would be able to look out and get in touch with nature. Attitudes about the Forest, its value, and what it represents, would change.

Managerial Impacts - This alternative would require the highest number of personnel dedicated to manage it. Costs would include being involved in overseeing and working with the transportation system operators. Interpreters on board the trolleys would be especially well trained and more of them would be needed to tie in with efforts at EPTFC.

Additional personnel would be needed at the point of access control to manage its implementation. With the elimination of vehicles when the trolleys are operating, pedestrian law enforcement officers would be in order. A process would need to be established to manage picnic site reservations and to make sure they are respected.

Dealing with upset publics would be frequent during the breaking in period of this access control policy. Extensive use of the media will be necessary to promote and justify the changes.

Expenditures to prepare recreation facilities and key features as trolley stops would be minor. Signage would be used for this purpose.

This alternative would provide the highest level of job satisfaction for Forest managers since they would be more involved with helping visitors learn about the Forest instead of trying to deal with minimizing problems related to excess use.

Socioeconomic Impacts on Rural Communities - The vision expressed by this alternative and shared by the community of Palmer, represents the greatest opportunity for sustainable economic development for the people of Palmer. The Transportation Center that would need to be built in phases, would house such a variety of services and activities that its long term economic benefits would outperform the short-term benefits created for the construction industry.

The Transportation Complex could become more of a Cultural Center that provides Forest and non-Forest bound visitors with food services, cultural displays of art and music, arts and crafts souvenirs, and area activity information. The socioeconomic benefits to the community of Palmer would only be limited by the community's willingness to take on the challenge of becoming the hub for products and services both Island and international visitors say they want and need.

This alternative also provides the potential for economic development for the South side of the Forest at Naguabo. This alternative proposes that Naguabo be the beneficiary of a concession to be provider of ecotouristic tours into the Forest's less developed area. Economic gains could be made by exploiting this opportunity with promotions and development of attractive services. The FS would recommend the South side to displaced users of the recreation corridor and would provide interpreters to help add value to the Forest experience.

Alternative-D (Open PR-191)

Environmental Impacts - Transforming the closed PR-191 recreation corridor into a through road used for the purpose of getting from one side of the Island to the other could cause significant negative environmental impacts on El Yunque. Traffic would increase substantially and will exasperate the already hazardous conditions that exist on the road. There would be increased air and noise pollution as well as a degradation of the Forest's visual character and appeal. The ambiance on the Forest would go from being proper for a recreation destination to being a panoramic route for those crossing over the Island.

The severity of negative impacts during days of high visitation will depend on the level of road access controls allowed by the authorities who have jurisdiction over the road. No access controls would result in even more vehicles than normal coming to and through El Yunque. Not having a dead-end situation where the recreation corridor ends would help

alleviate the problem. The use of shuttle mini-buses as optional transportation to visit the Forest would also help.

Social Impacts Within the Forest - The social impacts caused by an open PR-191 would include increased congestion from through traffic, additional hazards on the road from those in a hurry to get over the mountain to the other side, and the Forest's loss of appeal to local and international visitors.

Visitors walking in the Forest would be exposed to increased safety hazards. The present practice of standing in the middle of the road to take pictures of La Coca Falls would not be safe. Cars maneuvering in and out of parking lots will create additional hazards.

Having the shuttle buses running from Palmer and Naguabo would provide excellent opportunities for those not able to visit the Forest before because of lack of transportation.

Managerial Impacts - If highway authorities allow road closure during periods of high visitation, FS personnel needs would be similar to those in *Alternative-A* except that savings on reduced maintenance and resource protection would not be achieved. Forest facilities would be prime targets for use as public Restrooms for those just passing through.

FS law enforcement officers would be strained to provide adequate service since it is probable that much of their time would be consumed by traffic related problems. Other FS personnel would have to be assigned to protecting the public's health and safety.

Damage to facilities due to vandalism and thefts would increase. A big part of the Forest's operations and maintenance budget would be consumed by salaries for increased patrols to protect the public and by increases in maintenance and repairs of facilities.

Socioeconomic Impacts on Rural Communities - Both communities would stand to benefit from this alternative. Naguabo would have the most to gain from opening PR-191 as a through road. Each would have the opportunity to operate a shuttle bus system and transportation system. As with the other alternatives that provide potential for economic development, the benefits achieved will depend on each community's vision and ability to implement any plans recommended by experts in the area of sustainable rural economic stimulation and growth.

The FS would provide assistance and cooperation with the dual objective of caring for the Forest visitor and helping its neighbors achieve economic stability.



Process for Alternative Implementation



Process for Alternative Implementation

This process is presented with recognition that the preferred alternative identified in this study may not be the one that is eventually pursued. What this study has done however, is formalize a project concept and justify its need. Therefore, the process outlined is meant to serve as a guide through the steps required leading to implementation.

It is assumed that each action below will yield a decision to proceed.

I. Present this study for consideration.

This study's findings and recommendations will be presented to officials of the Caribbean National Forest for consideration. Before moving to the next step, they may request further analysis of data, and development of additional alternatives.

II. Decide on which Alternative(s) to pursue.

Forest officials will make a preliminary decision on which alternatives best respond to the needs of the Forest and its visitors.

III. Use these alternatives for scoping.

For the purpose of scoping to determine how favorable the general concepts of this study are, the alternatives will be presented to other Forest managers and officials from the impacted communities.

IV. Request the preparation of a comprehensive Transportation/Economic Feasibility Study.

The Transportation/Economic Feasibility Study will provide the necessary information to decide if an alternate transportation system to EL Yunque is feasible. The study would include the analysis of data and information that considers:

Operational Factors
Engineering Factors
Environmental Factors
Visitor Need Factors
Economic Factors
User Demand Factors

This feasibility study would also consider and incorporate a Planning Study presently being developed for the Municipality of Rio Grande. This effort was funded by the USDA

Economic Recovery Program with the objective of designing a strategy for the economic development for the Palmer area.

The feasibility study would start public scoping to gauge attitudes about changes in FS policy concerning access to El Yunque. Impacts to the community of Palmer would also be considered. A detailed cost estimate would be developed to help evaluate the feasibility of alternatives.

VI. Use the Feasibility Study as a basis to pursue implementable alternatives.

Realistic and implementable alternatives will be used to continue scoping and to eventually move into the NEPA (National Environmental Protection Act) process. Through the NEPA process, a preferred alternative will be selected and a Document of Decision prepared.

VII. Project is identified and funding sought.

The FS and other entities involved and interested in the implementation of an alternative transportation system will prepare promotional presentations aimed at three different audiences. They will include 1) Agencies with concerns for public health and safety on the road, 2) Entities who promote and have concerns for environmental protection conservation and interpretation and 3) Agencies who are charged with assisting in the economic development of rural communities. Some of these will be:

Potential Corporate Sponsors (Hotels/Resorts)
Interpretive Associations
Federal Highways Administration (ISTEA Funds)
Carreteras de Puerto Rico
Natural Resource Management Agencies
The Puerto Rico Tourism Company
The Puerto Rico Economic Development Council
The Puerto Rico Commerce Department

VIII. Funding is secured and the design process begins.

At this point funding and alternatives will not be an issue. The design process will be initiated. A detailed Design Prospectus will be prepared to guide the designers on what exactly is sought in the transit system and the facilities associated with it. The Design Prospectus will consider among other information, NEPA, recommended capacities, site and route characteristics, scenery management, local cultural and social customs, and customer needs.

From this point on the project takes on a different perspective. It is no longer a question of whether the alternative transportation system is feasible or will be done, but how it and

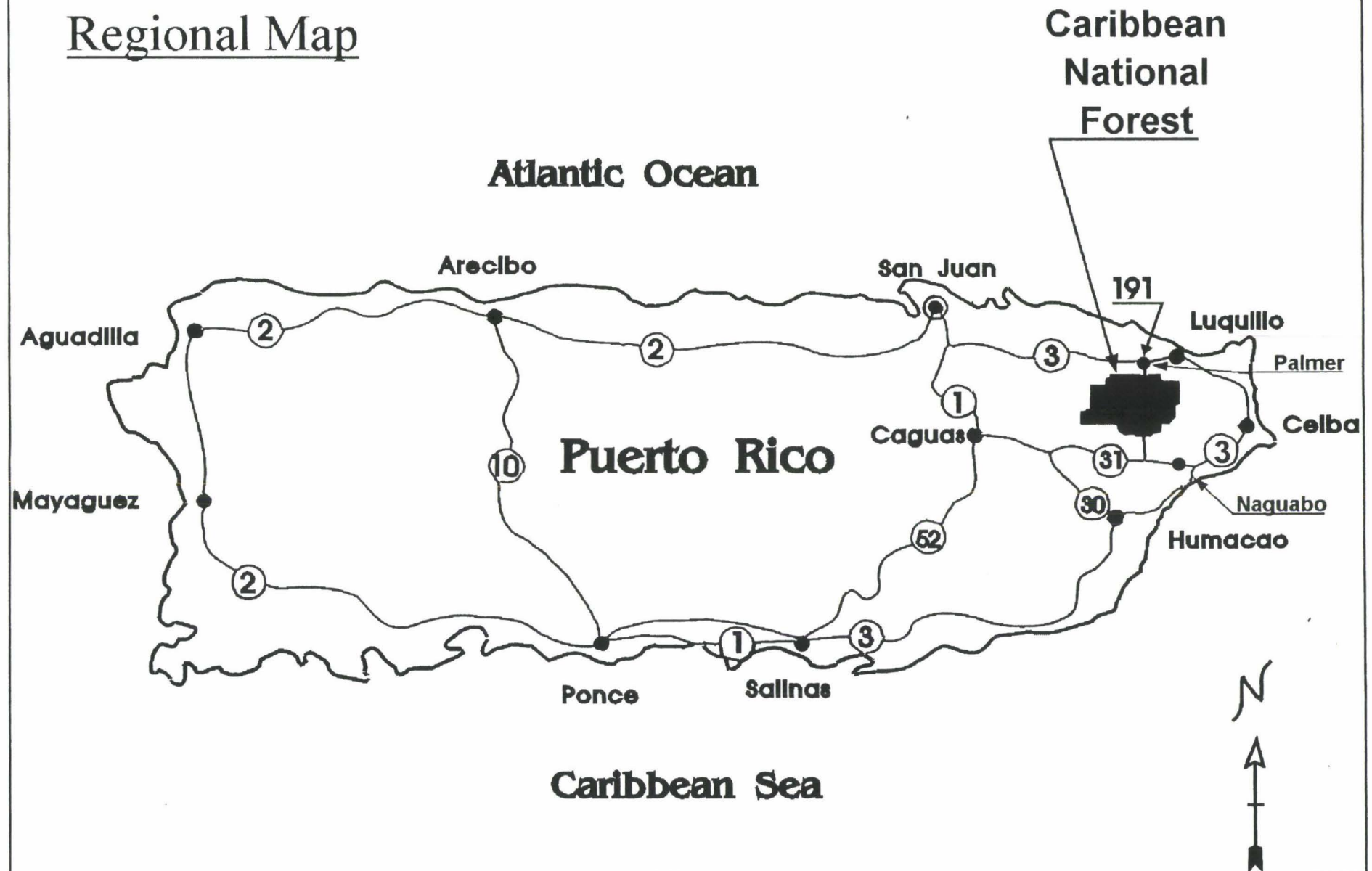
its related facilities will look and operate. It is also a question of how well the project will serve the public and satisfy the economic development needs of the affected communities.

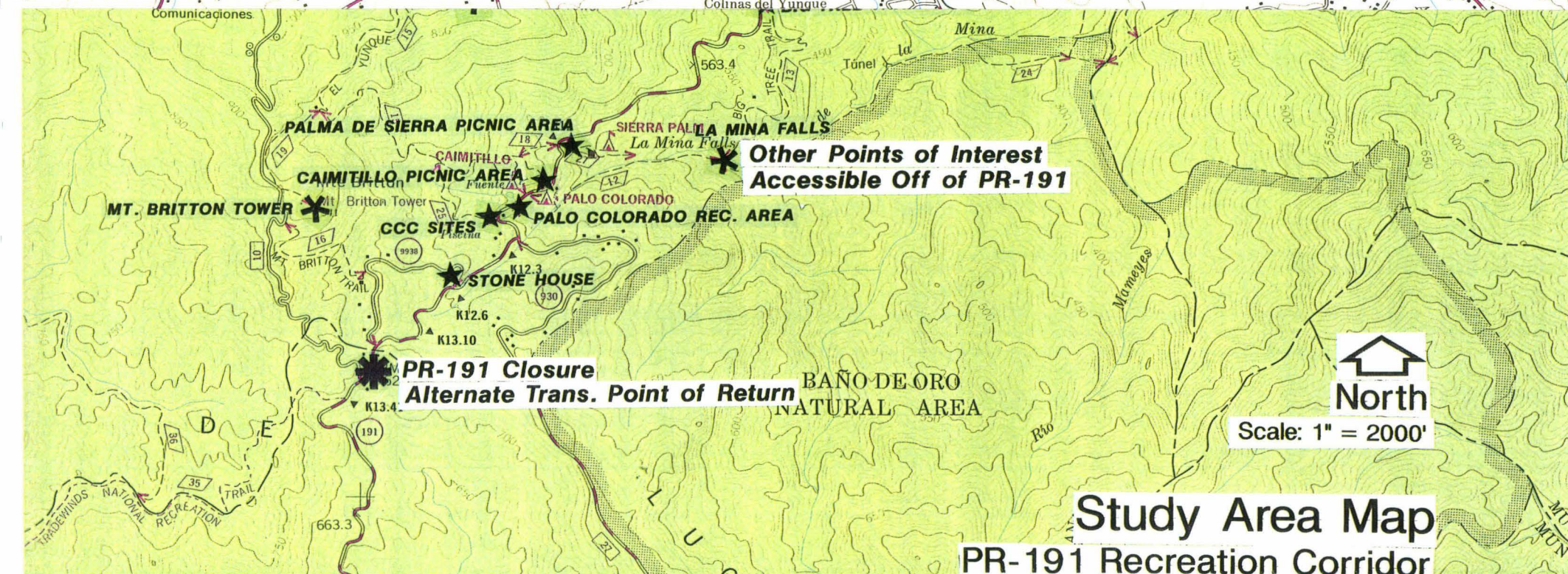
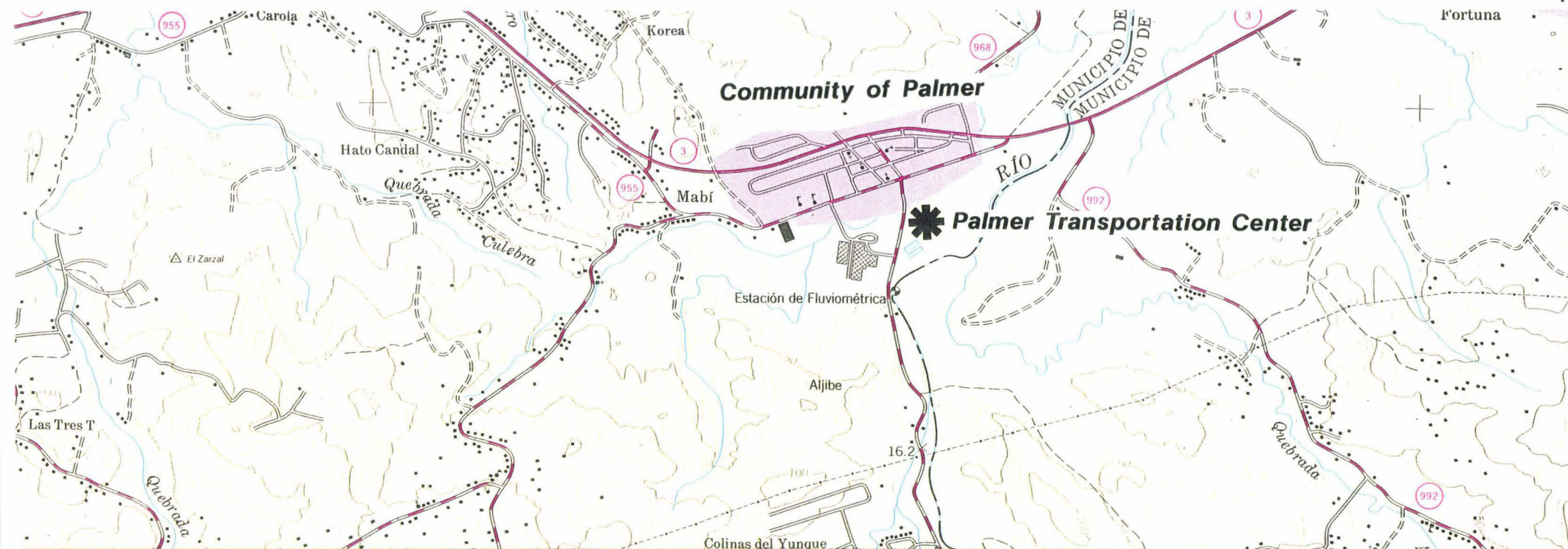
It is anticipated that an alternative transportation system will be eventually implemented. A final recommendation is that the concepts of Benefit Based Management be used to operate it. This would help assure that the system would be run with the overall goal of providing maximum benefits for the land, those who visit it, and those that are its neighbors.

Maps



Regional Map





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Other Sources of Data and Information

Interviews

Mr. Arturo Febry, Planner - February 10, 1994

Hired to prepare economic development plan for the Community of Palmer.

Mr. Jose R. Figueroa Baez, Director of Government for the Municipality of Rio Grande
February 14, 1994

Municipality of Rio Grade is the Government head for the Community of Palmer.

Ms. Nilda Arocho de Figueroa, Director of Culture and Tourism for the Community of Naguabo - February 23, 1994

Ms. Betsy Payne, Director of "Cabezas de San Juan" Mangrove Reserve and Light House
March 9, 1994 (also served as site visit)

A trolley and reservation system is used at this facility to transport visitors to mangrove area and Lighthouse. Interpretation is provided throughout the trip. Tour lasts approx. 2 hours.

Site Visits

Cuevas de Camuy Subterranean Cave Park, North central Puerto Rico - September, 1993

A trolley and reservation system is used at this facility to transport visitors to caves. Tour lasts approx. 2 hours.

Santo Domingo Botanical Garden, Santo Domingo, Dominican Republic - June, 1993.

A trolley system is used to tour visitors around the facility and provide interpretation. Tour lasts approx. 2 hours.

Visitor Surveys and Vehicle Counts

A total of 180 visitor surveys were conducted on Sunday, March 6th and Sunday, March 13, 1994.

Counts of vehicles traveling up the PR-191 recreation corridor were conducted between the hours of 9:00 AM and 4:00 PM on March 6th, 12th, 13th and 16th.

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